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# INDIA RUBBER WORLD

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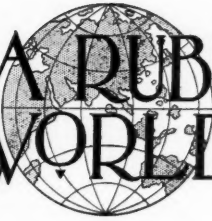
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# INDIA RUBBER WORLD



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## **Vulcanization of Rubber— Its Discovery and Practical Application**

**E. G. Holt**

THE beginnings of modern rubber manufacture are so largely the result of the discoveries, labors, and planning of a single individual that his life becomes an essential and intimate part of rubber history. This and a succeeding article will, it is hoped, show that his accomplishment was a really monumental achievement and that he richly deserved the rating last year officially accorded him by the Patent Office, among the ten greatest American inventors.

Some authors describe him as a visionary, achieving success by a single stroke of genius, when it was in fact a most painstaking observance of long-continuing experiments that brought the reward. Others describe him as a poor business man lacking financial judgment, when he was in truth a far-sighted prophet, extravagant only in his endeavor to promote the development of the rubber industry and in this always actuated by satisfactory business as well as more noble reasons, although in overconfidence of success, he sometimes failed to keep the necessary anchor to windward.

Most writers enlarge sensationally upon the privations and vicissitudes he experienced in the course of his rubber career, and indeed they are an integral part of the events leading up to his discovery and its practical application. His will to endure and persevere in spite of repeated failure, discouragement, and ill fortune has been made the subject of one entire book; it is the more remarkable because it derived wholly from the man himself, lacking the support of that fellowship which so often may account for heroism. He persevered alone, over a long period of time, with little sympathy, in the face of ill health, poverty, hardships, ridicule, and misunderstanding.

The story of Goodyear is an inspiration for accomplishment in the face of obstacles which sap the spirit of those who are not truly great.

### **Goodyear's Early Life**

Charles Goodyear was born December 29, 1800, in New Haven, Conn. He was a descendant of one of the founders of New Haven Colony. In 1807 Goodyear moved to Naugatuck, Conn., where he received his early education in the grade schools. In 1816 he attended the Thomas Parker School at Sharon, Conn. His father, Amasa Goodyear, was a small manufacturer of various hardware items, particularly steel-spring hay forks and manure forks which he had himself introduced in 1810. Charles at first intended to become a minister, but lacking means for the desired education, learned his father's business by working for him when not in school. It was during this time that he first became acquainted with rubber, the properties of a thin piece cut from an imported crude rubber bottle attracting his close attention even then. Completing a four-year apprenticeship with a Philadelphia hardware importing house, at the age of 21, he returned to Connecticut and became a partner with his father in hardware manufacture; in 1826 he moved to Philadelphia and established a commission business for the sale of Goodyear and other domestic hardware, still in partnership with his father. This was the first business of its kind in America as such items were then mostly imported. It proved an excellent business for four years, but in consequence of too liberal credit extensions to customers in southern states, and resulting heavy losses in 1830, they were obliged to suspend payments.

In 1824 Charles Goodyear married the daughter of Daniel Beecher, who ran an inn in Naugatuck and who later presented a park to the town of Naugatuck.

#### From Hardware to Inventing

In order to cancel a large portion of his indebtedness Goodyear disposed of the good will and control of the steel fork manufacture and later of his minority interest, but without obtaining a discharge of their former liabilities. As a result, claims against him on account of that business were shifted from one stranger to another, and endeavors to collect these claims by invoking the aid of the law of that day led to his repeated intermittent imprisonment for debt during the space of ten years. Hoping to recoup his fortunes, he determined in 1831 to make a profession of invention, the extent of his indebtedness making it unlikely that he could satisfy his creditors by merely ordinary accomplishment and frugality.

#### First American Latex Imports

His experience in rubber invention from 1834 to 1837 as related in the preceding article omitted one noteworthy and at the same time amusing incident. Impressed with the idea that solvents used for rubber were responsible for difficulties of manufacture, he felt fortunate in finding some 40 or 50 casks of rubber latex in New Haven in 1835, in some of which the latex had not coagulated, alcohol having been mixed with it before exportation from Para. This was the first known American importation of latex.

At that time the belief was quite prevalent that fresh latex, upon evaporation, might not be adhesive, and Goodyear secured and planned to experiment with this material. A young Irishman working for him caught the general idea, and determined to make some experiments on his own account. Accordingly, this would-be inventor applied latex to his trousers, thinking that on drying he would have a waterproof garment no more adhesive than the rubber shoes imported from Brazil. Then he sat down to work, on a bench near the fire, and in a few moments found that not only was he stuck to the bench, but his trouser legs were also stuck together. This demonstrated conclusively that adhesiveness was a quality inherent in natural rubber and not a consequence of its preparation or manufacture.

#### Rubber Shoe Rights Sold

Goodyear had progressed by 1836 to the point of preparing the first non-adhesive thin sheets of rubber, and applying the acid gas process to the manufacture of his patent rubber shoes, rights for manufacture of which he sold in 1837 to a Providence firm, presumably that of Isaac Hartshorn & Co., which was operated by Charles Jackson and Dr. Hartshorn. The earlier attempts at rubber manufacture had resulted so disastrously for inventors as to leave anything or anyone connected with the industry in disrepute. Remember, too, that in 1836-38 the United States was in the throes of a severe economic depression. It was these conditions that forced Goodyear to dispose of his patent shoe to the Providence company; he was unable to enlist capital otherwise, despite efforts over a period of nearly a year, and his own resources were exhausted to the point that he was constantly resorting to pawnbrokers to keep his family alive.

#### Goodyear Learns of Solarization

Disposal of the acid gas process for making shoes, and the latex sale of two other less important rubber developments to firms in Massachusetts, placed him in possession of a few thousand dollars and solved his immediate finan-

cial difficulties. In the Summer of 1838 he established himself at the Eagle company factory at Woburn, Mass., after having become acquainted with Nathaniel Hayward, who had been in possession of the plant, and whom Goodyear now employed. Through Hayward, Goodyear first learned of the use of sulphur as a drying agent for rubber.

Experimenting with sulphur at the Roxbury company factory where he also had access to their improved machinery, enabling rubber to be worked without a solvent, he noticed that if a minute quantity of sulphur was added to a large quantity of rubber, then spread thin on cloth and solarized, the material would dry in a single day and the sulphur would be evident on the dried surface; but, if a large quantity of sulphur were added either to dissolved or dry rubber, it would not be affected by exposure to the sun for a considerable time. This peculiarity attracted his interest and led him to continue experiments with sulphur and to purchase the solarization patent rights (Hayward had applied for the patent at Goodyear's urging) from Hayward; the patent was issued to Goodyear as assignee of Hayward on February 24, 1839.

#### Compounding Problems Cause Another Failure

Using both the acid gas and solarizing processes, Goodyear and Hayward made life preservers in the Fall and Winter of 1838-39 at the Eagle plant, and also overrating the merit of these processes, Goodyear began to produce a variety of fancy and artistic products. During the Winter the goods produced seemed to have the desired durability and were beginning to win some public favor. Along toward Spring he received an order for mail-bags from the government, and he completed production of these after warm weather came. In order to test them thoroughly he hung them up for a few weeks in the factory while he was absent. On his return he found them in the same state of partial decomposition characteristic of nearly all previous American attempts at rubber manufacture. Not only that, but the other goods sold during the Winter had spoiled similarly and began to be returned with claims for reimbursement. Goodyear had been so sanguine of success in manufacture with these two processes that he had talked of them widely and secured considerable credence and support. His creditors at once forced him into bankruptcy, everything that he possessed was sold at auction, and the reputation of the rubber industry reached its all-time low at this point.

Subsequent investigations satisfied him that the failure of the goods resulted from use of improper coloring materials in the compound and that the acid gas and solarization processes themselves had certain definite merits, albeit more limited than he had previously believed. Entirely without means now save such as he could obtain by selling small handmade rubber articles, or occasionally from disposal of some relic to pawnbrokers, and despite appeals of his friends that he renounce rubber and engage in some useful occupation, he nevertheless determined to continue his experiments. Only the facts that rubber now declined in price to about 5d a pound so that materials for experimentation only cost a few dimes and that manipulation of materials could be performed entirely with the fingers enabled him to carry on, and without the occasional aid of charitable acquaintances even such limited means would have been beyond his reach.

#### Discovery of Vulcanization

We cannot do better than quote from the inventor's own book "Gum-Elastic" with regard to the actual discovery of what was subsequently named "vulcanization" by Charles Brockedon, an English associate of Thomas Hancock, the name referring to the Vulcan of mythology



and representing the employment of sulphur and heat. Goodyear spoke of the product as "metallic gum-elastic," perhaps hinting at a conception that by introducing sulphur and lead, he had rendered rubber capable of replacing metals as well as organic materials in innumerable ways; it is certain he believed adaptability of vulcanized rubber lacked any definite limits, and the steady subsequent expansion of the industry, decade after decade, supports this notion. In considering this discovery remember that raw rubber is melted by heat at a low temperature, being partly melted even under the heat of the sun's rays; vulcanization is therefore accomplished by means, and in a manner, that would not have been anticipated from any reasoning on the subject, as a high degree of heat is essential in the processes which have found wide practical application.

"The inventor now applied himself alone, with unabated ardor and diligence, to detect the cause of his misfortune, and if possible, to retrieve the lost reputation of his invention; and, as had happened on former occasions, he had hardly time enough to realize the extent of his embarrassment, before he became intently engaged with another experiment. He made some experiments to ascertain the effect of heat upon the same compound that had decomposed in the mail bags and other articles. He was surprised to find that the specimen, being carelessly brought in contact with a hot stove, charred like leather. He endeavored to call the attention of his brother, as well as some other individuals who were present and who were familiar with the manufacture of gum-elastic, to this effect, as remarkable, and unlike any before known, since gum-elastic always melted when exposed to a degree of heat. The occurrence did not at the time appear to them to be worthy of notice; it was considered as one of the frequent appeals that he was in the habit of making in behalf of some new experiment.

"He however directly inferred that if the process of charring could be stopped at the right point, it might divest the gum of its native adhesiveness throughout, which would make it better than the native gum. Upon further trial with heat, he was further convinced of the correctness of this inference by finding that India rubber could not be melted in boiling sulphur at any heat ever so great, but always charred.

"He made another trial of heating a similar fabric, before an open fire. The same effect, that of charring the gum, followed; but there were further and very satisfactory indications of ultimate success, in producing the desired result, as upon the edge of the charred portions of the fabric, there appeared a line, or border, that was not charred, but perfectly cured.

"He now removed with his family to Lynn, in order that he might have access to the steam power of Messrs. Baldwin & Haskins, for the purpose of trying experiments in vulcanizing by steam.

"A few weeks after, he removed from Lynn to Woburn, where he now pursued his inquiries and experiments for

some months quite alone, until the desired result was obtained. On ascertaining to a certainty that he had found the object of his search, and much more, and that the new substance was proof against cold, and the solvents of native gum, he felt himself amply repaid for the past, and quite indifferent to the trials of the future.

"While the inventor admits that these discoveries were not the result of scientific chemical investigations, he is not willing to admit that they were the result of what is commonly termed accident; he claims them to be the result of the closest application and observation.

"The discoloring and charring of the specimens proved nothing, and discovered nothing of value, but quite the contrary; for the specimen that was charred was disregarded by others. It may be considered as one of those cases where the leading of the Creator providentially aids his creatures by what are termed accidents, to attain those things which are not attainable by the powers of reasoning he has conferred on them."

### Difficulties of Initial Vulcanization

The discovery is often treated by writers as a climax, but in reality it brought in its wake so many problems that it is properly to be regarded merely as the first discovery in a series. Goodyear alone realized its importance. Such events are never hailed publicly; they become public knowledge only after long delay. Invention of a new process is a distinct matter from demonstration of its practicability and utility. Goodyear had now to convince others of what he himself knew, and days grew to weeks, weeks to months, and months to years, before this was accomplished, although he had satisfied himself of the tremendous importance of his discovery early in 1839.

After a few months he communicated his formula to Professor Silliman of Yale College, who issued a memorandum to him, October 14, 1839, stating: "Having seen experiments made, and also performed them myself, with the india rubber prepared by Mr. Charles Goodyear, I can state that it does not melt, but rather chars, by heat, and that it does not stiffen by cold, but retains its flexibility in the cold, even when laid between cakes of ice."

This much—after six months or more.

Goodyear needed to prepare samples to demonstrate the utility of his new process. He soon prepared some small samples, but they looked too much like raw rubber to be convincing, and in order to vulcanize larger articles he had to develop ways and means. He underwent further bitter trials while solving problems incident to any utilization of his process even upon an experimental scale; decomposition of compounded materials before they could be vulcanized, and incomplete or faulty vulcanization, led to repeated failures, doubly disheartening to one in his penurious condition. Sometime in early 1840 he received limited, but very helpful financial assistance from O. B. Coolidge, of Woburn, Mass. Later, aided by his brother-in-law, William C. Deforest, of Naugatuck, Conn., he got in touch with William and Emory



Charles Goodyear

Rider, of New York, who early in 1841 began regularly providing means for the experimentation necessary to overcome the series of initial obstacles to practical uniform vulcanization of rubber. Progress was made gradually, and in the early fall he first succeeded in making some few yards of thin rubber sheeting, uniformly vulcanized by passing through a heated cast iron trough—a dry-heat process.

#### Shirred Rubber Goods

Also in 1841 he invented the so-called "shirred" or "corrugated" rubber goods, and this invention it was which first enabled him to win to a state of comparative financial security, because the Riders had failed financially, and withdrew their support after about a year. From this time he was more effectively able to draw public attention to the vulcanization process. The shirred goods were so important during the early years of the vulcanized rubber industry as to demand more than casual mention. Their manufacture consisted of taking two pieces of suitable woven textile material, coating each on one side with rubber solution, enclosing between them threads of unvulcanized (later, vulcanized) rubber drawn to the required tension, and pressing the material together between rollers. Releasing the pressure, the extended elastic threads would contract, shirring or wrinkling the fabric. Such goods were first made of ribbons and used for suspenders; later they were used in corsets and in very large quantities as the goring for Congress boots.

This was the beginning of the American elastic webbing industry, now considered a section of the textile instead of the rubber industry, but for some decades included by census officials under the latter. In the 1840's it was the second most important branch of the industry, if it did not actually rank first. This manufacture was concentrated around New Brunswick and Newark, in New Jersey. The value of production of suspenders alone in some years reached a million dollars.

In 1844 letters patent were issued to Goodyear and to Horace H. Day for improvements in the manufacture of shirred rubber goods, and, also, in that and the following year, to Day, in conjunction with Tyer and Helm, of New Brunswick, and to James Bogardus, for shirring machines which greatly facilitated the manufacture. Shirred goods and suspenders were made in considerable quantities by several establishments at Newark, New Brunswick, and elsewhere under license from Goodyear, and also by Day and his associates who refused to pay license fees.

#### Patent Specifications Filed at Washington

On December 6, 1841, Goodyear had drawn up and witnessed before Dennis Kimberly, justice of the peace at New Haven, a document representing the original specification of patent for "Goodyear's Patent Fabrics," the stated method of manufacture providing for the use of rubber and sulphur, with or without white lead or other oxides of metals or other pigments, the goods to be made either of these materials dissolved in turpentine or ground together thoroughly dry, and the prepared material to be exposed to about 270° of heat by running between heated calenders or heated metal plates, or through a furnace or oven, or by immersion in any article that is melted or fluid at about the specified degree of heat, or by boiling rubber in water containing sulphur; and also mentioning solarization.

The description of the process, in this document, has often been mentioned as intentionally vague, but each of the points above outlined is clearly specified. Note particu-

larly that its terms are sufficiently broad to cover steam vulcanization (under immersion in fluid at 270°) although steam was not mentioned as such. From the previously quoted section it appears that Goodyear had experimented both with steam vulcanization and with immersion in boiling sulphur.

The effect of this sulphur-heat process was described as an improvement of the fabrics over previous rubber goods—"These fabrics are not injured by any kind of oils and cannot be rendered adhesive by them, nor are they soluble like gum-elastic in turpentine or other essential oils, although by long exposure to them they may be rendered somewhat pulpy . . . they are not stiffened by cold, or melted by any degree of heat unless placed in the fire."

Elsewhere Goodyear speaks of this as the *change*, the same word used by Hancock in describing the process which he developed later.

This document was deposited in the Patent Office of the United States as a caveat or claim of the invention, instead of application being made under it for a patent. Goodyear lacked funds at the time, he was having great difficulty in interesting capital in manufacture under his process; under these circumstances he feared his process might be pirated if patented, he desired to determine if possible whether any other agent than sulphur would similarly affect rubber, and finally he wished to secure patents in foreign countries and lacked means to do so until 1843—the foreign laws (he understood) required that application for patent there should be made simultaneously with the United States application.

#### Some Early American Manufacturers

There were a few rubber companies in existence at this time, making waterproof cloth and varnishes for shoes, in addition to the Hartshorn company at Providence making Goodyear "patent" rubber shoes. INDIA RUBBER WORLD lists some of the companies operating at that early period, with dates of establishment claimed as follows:

Alfred Hale Rubber Co., Boston, Mass.	1837
Hodgman Rubber Co., New York, N. Y.	1838
National India Rubber Co., Providence, R. I.	1840
Bourn Rubber Co., Providence, R. I.	1840
L. Candee Co., New Haven, Conn.	1842
Meyer Rubber Co., New Brunswick, N. J.	1843
Goodyear's Metallic Rubber Shoe Co., Naugatuck, Conn.	1843

The last-named concern was originally known as the Naugatuck India Rubber Co., under which title it was organized to become the first licensee under the new process. Goodyear had been in constant fear lest his invention be pirated and its benefits lost both to himself and his numerous creditors, whom he was still bent on satisfying although at this time he at last took advantage of the bankruptcy law to secure relief (he paid these debts later). The articles first manufactured under his license included suspenders, the so-called "metallic" rubber shoes, and elastics, with some descriptions of clothing. Goodyear at first thought of engaging personally in rubber manufacture, but decided that by licensing numerous concerns the benefits from his discovery would be sooner realized and more widespread; more important, he wished to be free to apply his discovery in new directions, developing new applications of rubber and improvements in compounding and manufacturing methods, particularly the former, and to these aims the next ten years of his life, as well as the royalties received from licensees, were largely devoted.

(Continued on page 44)

# Pioneering Carbon Black in American Tires

S. C. Stillwagon



Carbon Black Burner Houses

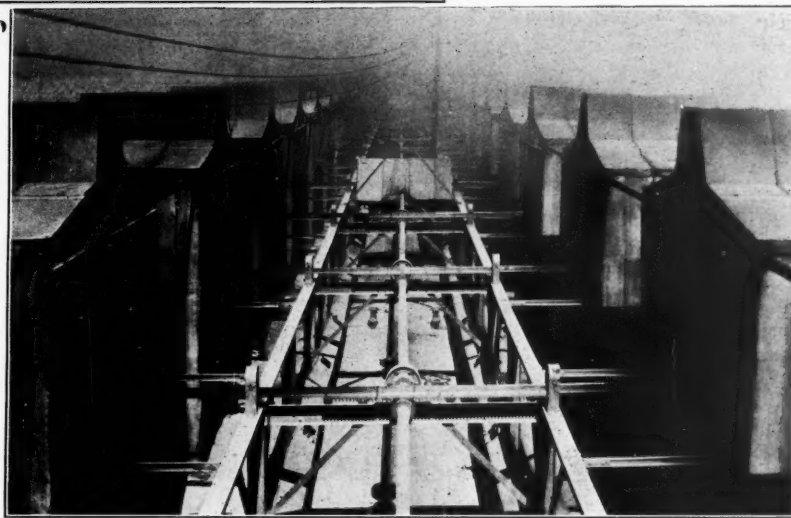
RECORDS indicate that as early as 1830<sup>1</sup> lampblack was regarded as a coloring pigment in rubber, and in 1855 Charles Goodyear<sup>2</sup> wrote that "Lampblack is often used to cause the gum to endure the effects of sun and weather." There are numerous other references to the use of lampblack in rubber during the nineteenth century. Gas black was first prepared in America in 1872,<sup>3</sup> but it is not known when it was first used in rubber. However there is every indication that the early use of carbon black or lampblack was in small percentages and solely as a color pigment. The realization of its reinforcing power and the development of its use for tires in America really got under way in 1912.

## The Silvertown Cord Tire and Carbon Black

In the year 1909 the Diamond Rubber Co. of Akron purchased the rights for the manufacture of the Silvertown cord tire in the United States from the India Rubber, Gutta Percha & Telegraph Works Co., Ltd., in Silvertown, England. J. D. Tew, of the Diamond tire department, was sent to the London factory for

the purpose of learning all of the details and purchasing machinery for the manufacture of this new tire. While in that country he was in close contact with Christian Gray, works manager of the English company, who had technical knowledge of all phases of tire manufacture.

The first Silvertown cord tire machines installed in the Diamond Rubber Co. were very complicated and used heavy cords of approximately 3/16-inch diameter. The old standard tire with woven fabric carcass and white tread had a fairly well balanced construction as the carcass and the tread wore out at about the same time after



Channel Operating Mechanism

three or four thousand miles. The new cord carcass stood up much longer than the fabric construction and was in wonderful condition when the white tread was worn out. Thus it became necessary to find a tread that would wear as long as the cord carcass, and naturally the question arose as to the practice in England. The first use of carbon black in sizable quantities for tires in the United States is described by George Oenslager, then with the Diamond Rubber Co., as follows:

"Early in 1911 after Mr. Tew's return to Akron, Mr.

<sup>1</sup> T. Hancock, British patent, Aug. 5, 1830.

<sup>2</sup> Charles Goodyear, in "Gum Elastic," published 1855.

<sup>3</sup> "On the Preparation of Carbon Black from Natural Gas in America." G. L. Cabot, *J. Soc. Chem. Ind.*, 13, 128 (1894).



Gray sent him a recipe which had been developed at the London factory for use as a tire tread. This tread contained about 17½ per cent of carbon black on the total weight of the compound. After studying this recipe, Mr. Tew and I concluded that it contained materials detrimental to the best tread wear and we accordingly simplified the recipe, taking full advantage of our knowledge of organic accelerators, which at that time was highly advanced. We did, however, recognize the fact that the carbon black was a desirable constituent and retained it in the formula. Laboratory tests convinced us that the modified tread recipe was much superior to that furnished by Mr. Gray and that carbon black was a material which imparted to a tire tread physical properties not attainable by any of the pigments then commonly in use.

"Experimental tires were made to which were applied on one-half of the circumference our standard white tread, and on the other half black tread containing carbon black. These tires were run on test cars. After a few thousand miles of service the marked superiority of the carbon black tread became very apparent. During the experimental work large numbers of tires having carbon black treads were tested on taxi cabs where the mileage could be accurately determined and in many other services. These tests were continued for several months before any black tread tires were sold."

It is reported by other sources that this black treaded tire seemed to behave differently on the road and the car would handle more easily than with the white tread. The black tread appeared to reach down and grab the road and hold it instead of simply having a hard surface which did not grip the road as with the white tread. The carbon black originally used by the English company and known as No. 40 black had been obtained through the London office of Binney & Smith Co. and was first used solely as a coloring agent by the India Rubber, Gutta Percha & Telegraph Works Co., Ltd.

#### Early Manufacturing Practice

In 1911 A. F. Kitchel, with Binney & Smith Co., was spending most of his time at its plants in West Virginia getting very dirty, but well acquainted with the production of carbon black. West Virginia was the only state producing carbon black outside of a few special grades which were produced in Pennsylvania. There were a number of different grades for coloring purposes among which was what was designated as No. 40, very high in color and with great tinctorial strength. The chemical differences between these various grades were not so well known then as they are today. Two or three different processes were in use in the West Virginia plants in those days; some gave a better product or yield than others. Some plants were based fundamentally upon the same process which exists today in most channel plants, while others employed what was called the "Ring" or "Disk" process. In the channel process each carbon black building had two tables of channels parallel to each other instead of the later design of one table per building which gives much closer control. In those days a unit plant did not generally consist of more than six of these houses. Gas consumption and the production of black were small, and the process was not considered to be highly technical as very little difficulty was encountered in the manufacture.

During 1911 Binney & Smith Co. began to receive a series of small unsolicited orders, of not more than a ton at a time, from the Diamond Rubber Co. calling for No. 40 black. No mention was made as to how it knew of the No. 40 black, but as the orders continued to come through, Binney & Smith filled them.

#### Goodrich Investigates Supply

Early in 1912, about the same time as the consolidation of Goodrich and Diamond, which became effective April 1, 1912, Binney & Smith received a letter signed by Charles Wolf, purchasing agent of The B. F. Goodrich Co., requesting that someone come to Akron to talk with them regarding carbon black. As Mr. Kitchel had just returned from his work in the West Virginia plant and at that time had charge of the laboratory at the Fulton St. office in New York City, he was chosen to go.

Regarding the interview, Mr. Kitchel said: "After meeting Dr. Geer, I was put through a most intensive grilling and instead of knowing everything about carbon black, as I had thought I did, I then realized that I knew very little."

"Goodrich said they were interested in larger quantities and wanted to know if there was any difference between the gases which we burned; any difference between the No. 40 black and other grades; what made some blacks more intense in color and others more powerful in tinctorial strength. They inquired regarding cost of production, price controlling factors, and the trades we were serving at that time and particularly as to the approximate quantity these trades were taking and how much we could produce. Nothing was said about fineness or particle size. I gave them all the information possible and explained that our largest customer then consumed approximately 500,000 pounds per year and that the total annual production of the carbon black industry in West Virginia did not exceed 25,000,000 pounds. At that time, which was in the Summer of 1912, Goodrich ordered and received the first full carload of carbon black that was ever shipped to a tire manufacturer."

#### Adoption of Black Tread

In the course of six weeks or two months, approximately June, 1912, Mr. Kitchel was asked to go to Akron again and was then introduced to Arthur Marks, vice president of the reorganized B. F. Goodrich Co., who, according to Mr. Kitchel, explained the situation along the following lines:

"The B. F. Goodrich Co. is now prepared to embark upon a revolutionary procedure in the manufacture of tires in that we intend to change our compounding and to put out a black tire primarily because research has indicated that we can provide in such a tire, a very much tougher tread stock than heretofore. Because these tires will have a different appearance to the public, a large advertising campaign will be required and we propose to spend \$1,000,000 the first year in order to acquaint the public with what we are going to do for them."

"We believe in this proposition but we don't propose to go ahead unless Binney & Smith Co. will protect The B. F. Goodrich Co. on two things: first, one million pounds per year of carbon black of a quality based on our ideas such as we have worked out on the No. 40 grade, for a period of three years and at a price; and second, we will expect to have your promise of the confidential handling of this matter for a while; we are not going to hold it up unduly, but we don't want you to exploit it until we know that we are well established."

As some of these questions required the sanction of an executive of Binney & Smith Co., Mr. Kitchel wired the New York office and then came back as far as Philadelphia to meet C. Harold Smith, of Binney & Smith Co., who was taking the night train to Akron. When Mr. Smith heard the story, he did not say much, but he doubtless foresaw the tremendous possibilities, for the next day he assured the men at Goodrich that, given a fair amount



of time, Binney & Smith would undertake a contract to furnish one million pounds per year for three years, with the desired exclusive use in tires for a reasonable period. A price of 4.4¢ per pound f.o.b. the West Virginia plant was agreed upon. Late in 1912 or early 1913 shipments were started on this contract. George Oenslager, of Goodrich, confirms the fact that when the black tread was adopted, all Silvertown tires made in the United States carried this new compound in which the carbon black was approximately 17½% on the total weight.

Immediately Goodrich started its publicity campaign with full-page newspaper advertisements throughout the United States, featuring the Black Barefoot tire and stressing the ease with which the tire handled on the road and its power to grip the road. Reports indicate that very little, if anything, was said in these advertisements about greater wearing qualities of this tire.

#### Release to General Trade

In 1914 after the European war had broken out and about half of the contract period had expired, the increased cost of labor and materials had driven the production cost of carbon black up to such a point that Binney & Smith could not continue the contract without taking a tremendous loss. Since the institution of the contract Mr. Kitchel had made frequent trips to Goodrich, and the best of relations existed between the two companies. Accordingly he was sent out to discuss the situation with Mr. Marks and Mr. Wolf, who were very considerate and said they were meeting the same situation in many other directions. They asked what the current market price was, and upon being told that it was 8¢ per pound, considerable discussion followed after which The B. F. Goodrich Co. voluntarily adjusted the contract price up 50% to 6.6¢ for the balance of the period.

Mr. Marks also said that owing to the war condition and other factors the general situation had changed decidedly and that they would then release Binney & Smith from any further obligation to keep secret this remarkable reinforcing power of carbon black and that they could feel free to introduce it elsewhere on condition, of course, that provision was to be made for the Goodrich needs.

In Mr. Kitchel's own words: "Since Goodrich had shown this magnificent spirit of cooperation, we, of course, did everything within our power to take care of them."

Around midyear 1914 Mr. Kitchel started to contact the general trade and made the acquaintanceship of Goodyear and the other tire manufacturers. The field was large because there was an exceptional demand for rubber tires, and in a short time more than 150 active tire accounts were on their books.

#### "Inert" Black

Binney & Smith Co. was impressed by the fact that every other material used was of a chemical nature, had a chemical reaction, and therefore was not stable. Here was a reinforcing pigment which apparently did not act on anything else, or was it acted upon, and so the firm termed it "Inert" black, under which name it was then sold. As relations with other companies progressed, some splendid development work was done by many of the tire manufacturers.

The Republic Rubber Co. introduced a "Prodium" process which used carbon black under the code name of "Inertia" taken from Binney & Smith Co.'s trade name "Inert." Republic bought from Binney & Smith many pounds of "Inertia," and as late as 1922 this name appeared on their order books. Great contributions to the development of the use of carbon black as a reenforcer

were made by C. O. North at Goodyear; Dr. K. J. Thompson at Mansfield; and McMahon at Morgan & Wright.

#### Technical Service

Expansion of the technical and sales service within the organization of Binney & Smith Co., who had pioneered the adoption of carbon black as a reenforcer, can best be told in Mr. Kitchel's words:

"About the time that North's articles began to appear, we became much intrigued by some articles over the signature of W. B. Wiegand, then connected with a Canadian company, and also we began to get the idea of closer specifications from certain consumers. Previously we had continued to specialize on this No. 40 or "Inert" black, and had religiously maintained our specifications on color and tinctorial strength, which had been the main guides. These articles by North and Wiegand brought up other points with important bearing on how carbon black performed and why it behaved in that manner. As we were receiving requests from some of our consumers regarding technical and compounding details of the blacks, we initiated correspondence with Mr. Wiegand. We thought we knew the carbon black situation, but we did not know how to interpret it to the rubber man's way of thinking. We started in 1920 with Mr. Wiegand a sort of mail consulting service; we would pass our questions on to him and after due consideration he would write us as to the proper answer which we would pass on to our customers. That method became cumbersome because inquiries multiplied, and we finally came to the conclusion that in addition to members of our own staff who were familiar with the manufacture of carbon black, we needed someone who could bring us the rubber man's aspect and knowledge. This condition resulted in the addition of Mr. Wiegand to our regular staff.

"The necessity for aiding in customers' problems enlarged rapidly. Mr. Wiegand was delving into the theory of application. We soon found that besides the theoretical and physical approach, we needed additional servicing on compounding procedure. We decided that this phase of the work required just as capable handling, and thus in 1923 arrangements were made for D. F. Cranor to join our organization from the Lee Tire & Rubber Co., where he was one of the recognized authorities on factory practice and compounding technique.

"Since 1926 the industry has increased more than ten-fold and a great deal more information regarding carbon black has been established. In 1936 Binney & Smith Co. supplied over 120,000,000 pounds, the great bulk of which went to the rubber trade all over the world. The trek of carbon black followed the excess gas supply from Pennsylvania to Indiana, to West Virginia, to Kentucky, to Louisiana, and now to Texas."

#### Tribute to Pioneers

Although the carbon black tread received its highest development and appreciation in the United States long before its merits were generally recognized in Great Britain, this great progressive activity was prompted by the work which had been done by some technician or group of technicians in the employ of the India Rubber, Gutta Percha & Telegraph Works Co., Ltd., of Silvertown, England, of which S. C. Mote was then chief chemist.

At the time of the consolidation of Diamond and Goodrich, Dr. David Spence, A. L. Freedlander, Arthur Kempel, and Harry Huffman were associated with Dr. W. C. Geer, George Oenslager, and J. D. Tew, and undoubtedly each had an important part in this advancement

(Continued on page 46)

# An Air-Bomb Aging Test for Tread Compounds<sup>1</sup>

E. W. Booth and D. J. Beaver<sup>2</sup>

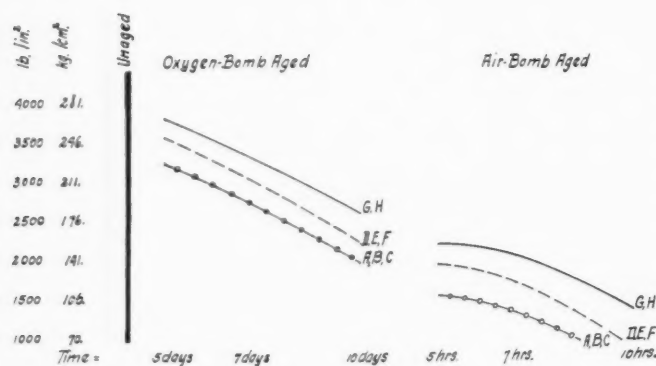


Fig. 1. Aging Tests

Cure, 75 minutes at 274° F. (134° C.). Base stock: smoked sheets, 100.00; carbon black, 50.0; zinc oxide, 5.0; stearic acid, 3.0; pine tar, 2.0; antioxidant, 1.5.

Added to base stock:

	Sulphur	Accelerator		Sulphur	Accelerator
A	2.25	1.25	E	1.25	2.20
B	2.00	1.50	F	1.00	2.40
C	1.75	1.75	G	0.80	2.80
D	1.50	2.00	H	0.60	2.80

THE comparative age-resisting properties of tire tread compounds are determined in the laboratory by either oxygen-bomb or Geer-oven aging tests. The conditions under which these tests are carried out are standardized, and from their results reliable predictions are made concerning the natural aging life of the tread compounds.

A few years ago oxygen-bomb aging tests, comparing first-quality tread compounds, could be satisfactorily carried out in from 39 to 48 hours, in which time the tread compound lost about 50% of its original tensile. Today, largely because of the development of better antioxidants and organic accelerators, oxygen-bomb aging tests carried out under the same conditions require between four and ten days to cause the same percentage loss in tensile, and the time necessary to carry out a Geer-oven aging test has been correspondingly increased. Therefore it is very desirable to develop a shorter laboratory aging test which can be correlated with the oxygen bomb or the Geer oven and which should be indicative of natural aging results.

The use of the air bomb as a laboratory method of carrying out aging tests has been previously suggested.<sup>3</sup> However papers recognized that the conditions therein employed were too severe to permit reliable comparisons of the aging properties of tread compounds.

<sup>1</sup> Presented before the Division of Rubber Chemistry at the 92nd meeting of the American Chemical Society, Pittsburgh, Pa., September 7 to 11, 1936. Reprinted from *Ind. Eng. Chem. (Anal. Ed.)*, 9, 1, 18-20 (1937).

<sup>2</sup> Monsanto Chemical Co., Rubber Service Laboratories Division, Nitro, W. Va.

<sup>3</sup> E. W. Booth, *Ind. Eng. Chem.*, 24, 555 (1932); *Rubber Age* (N. Y.), 34, 268-71 (1934).

## Experimental Procedure

The procedure recommended by the American Society for Testing Materials, designated as D412-35T, was followed in carrying out the milling, vulcanizing, and testing of the rubber compounds described in this paper, and the D428-35T recommendations were followed in carrying out the oxygen-bomb and Geer-oven aging tests, with the exception that in both cases only two test pieces were broken instead of three, and in the case of the oxygen-bomb and Geer-oven aging tests one-half of the usual press-cured sheet was employed instead of the usual dumbbell test pieces.

The air-bomb aging conditions referred to as being too severe consist in placing the usual dumbbell test piece in a rack, and elongating 50%; the rack is then placed in the air bomb, and a temperature of 260° F. (126.7° C.) and an air pressure of 100 pounds per square inch (7 kg. per sq. cm.) are maintained for the duration of the test. These conditions were employed in carrying out the first series of tests in which the ratio of sulphur to rubber was varied. The results are shown in Figure 1.

In the second series of tests the elongation was varied between 0 and 50%, the air pressure between 50 and 100 pounds per square inch (3.5 and 7 kg. per sq. cm.), and the temperature between 210 and 260° F. (98.9° and 126.7° C.). Only a single variation was made in any one test and the duration of the test was kept constant at five hours, as shown in Figure 2. From the data obtained in these as well as additional tests the following conditions were adopted as more suitable for the comparing of tread compounds: elongation, 0; pressure, 50 pounds per square inch (3.5 kg. per sq. cm.); temperature, 220° F. (104.4° C.); and time, 10 hours. These "modified" conditions were employed in carrying out all the later tests shown.

In the third series of tests the oxygen concentration was varied by dilution with nitrogen. The usual dumbbell test pieces were employed here, and the end point of the test was the time necessary to cause a loss of 40% in tensile.

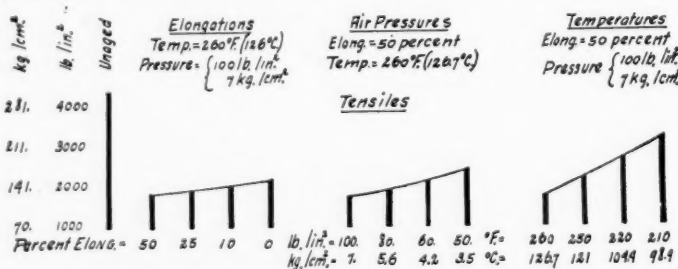


Fig. 2. Effect of Variations in Conditions of Air-Bomb Aging

Cure, 60 minutes at 274° F. (134° C.). Aging time, 5 hours. Base stock: smoked sheets, 100.00; carbon black, 50.0; zinc oxide, 5.0; sulphur, 2.75; stearic acid, 3.0; pine tar, 2.0; accelerator, 1.25; antioxidant, 1.50.

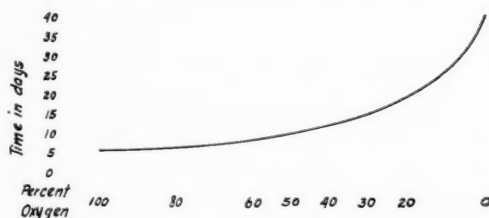


Fig. 3. Effect of Oxygen Concentration

Same base stock as in Fig. 2. End point, loss of 40% of original tensile. Total pressure, 300 pounds per square inch (21.1 kg. per sq. cm.). Temperature, 158° F. (70° C.). Oxygen concentration varied from 0 to 100%.

### Discussion

The results of previous laboratory comparisons of heat-resisting inner-tube compounds, which were carried out in the air bomb, established the theory that a low ratio of sulphur to rubber was necessary.<sup>3</sup> Therefore the first series of tests in this study was carried out to determine whether or not tread compounds with low sulphur ratios aged better than tread compounds containing normal sulphur ratios and to present data to show that these air-bomb aging conditions were too severe to permit reliable comparisons of tread compounds. The results are shown in Figure 1.

It is known that tread compounds such as those shown in Figure 1 are not practical because of their poor resistance to flex cracking and abrasion. The unaged results are not shown, but to maintain the same rate of cure for all the compounds it was necessary to increase the accelerator ratio as the sulphur ratio was decreased. A range of cures was carried out, and aging tests were made on several cures. However, the 75-minute cure at 274° F. (134° C.) was chosen to make up this chart because it was the optimum cure. The unaged tensiles of all the compounds were the same within the usual laboratory error of  $\pm 5\%$ . The unaged modulus figures varied between about 3,000 pounds per square inch (211 kg. per sq. cm.) in the case of the *A* compound to about 2,300 pounds per square inch (161.7 kg. per sq. cm.) in the *H* compound. Figure 1 represents the results of the *A*, *B*, and *C* compounds as being alike, but actually the results shown are the averages of the three results. The same is true, in the case of the *D*, *E*, and *F* and the *G* and *H* compounds. This was done in order to present a clearer picture.

The results show that reducing the sulphur ratio has improved the age-resisting properties of the tread compounds in the case of both the air-bomb and the oxygen-bomb aging, the improvement being greater in the case of the air bomb. However even the *G* and *H* compounds show a loss of about 50% in tensile due to seven hours' aging in the air bomb; whereas previous tests showed that a heat-resisting inner-tube compound lost only about 30% in tensile through aging 18 hours under the same conditions.<sup>3</sup> Therefore these air-bomb aging conditions are too severe, and since the main difference between the composition of the heat-resisting inner-tube compounds and tread compounds *G* and *H* is the use of P33 black and carbon black, respectively, the conclusion seems obvious that carbon black does not age so well as some of the other compounding ingredients. Schoenfeld<sup>4</sup> recognized the relatively poor aging properties of carbon black and attributed them to oxygen or oxygen compounds in the carbon black.

The second series of tests was carried out

to determine which of the air-bomb aging conditions had the greatest effect on the results. The data shown in Figure 2 indicate that the temperature employed has the greatest effect. These results, together with a few confirming tests, led to the adoption of the "modified" air-bomb aging conditions given above.

The compound employed here and in all the later tests is probably higher in accelerator and antioxidant ratio than is usual in commercial compounds. The accelerator employed in all the compounds in this paper is dibenzothiazyl dimethylthiol urea, and the antioxidant employed is a ketone-primary aromatic amine reaction product. This compound has an excellent range of cure, showing no indications of overcure up to the 105-minute cure. The abrasion index and flex cracking resistance are excellent. The 400% modulus figure of the cure shown was about 3,200 pounds per square inch (225 kg. per sq. cm.), and the tensile was about 4,400 pounds per square inch (309 kg. per sq. cm.).

In the third series of tests the oxygen concentration was varied in an attempt to obtain data which would explain the differences between the results of the oxygen-bomb and the Geer-oven aging tests and perhaps suggest better conditions under which to carry out comparisons of tread compounds. The results are shown in Figure 3. The only obvious conclusions that can be made from these results are that a temperature higher than 158° F. (70° C.) is necessary materially to shorten the time necessary to carry out aging tests, even though the oxygen concentration is 100%.

In the fourth series of tests a comparison was made of air-bomb, oxygen-bomb, and Geer-oven aging, and the results are shown in Figure 4. The "modified" air-bomb aging conditions were employed in this comparison. The results show a correlation of the three aging methods. A horizontal line was drawn which represents a loss of 40% in tensile (indicated as "correlation") and shows that about ten hours' aging in the air bomb has brought about the same loss of tensile as about seven days' aging in the oxygen bomb or 28 days' aging in the Geer oven. Realizing that many more tests must be carried out before an exact correlation of the three aging methods can be made, this apparent correlation is shown to emphasize the shorter length of time necessary to carry out air-bomb aging tests and to explain the reason for adopting these various times in carrying out later comparisons.

Also shown in Figure 4 are the results of tests to determine whether the same correlation held for various amounts of carbon black. As the carbon black content is increased from 0 to 50% based on the rubber content, the unaged tensile increases rapidly until about 40% of carbon black is present. At this point the tensile decreases rapidly. The air-bomb and Geer-oven aging also show a

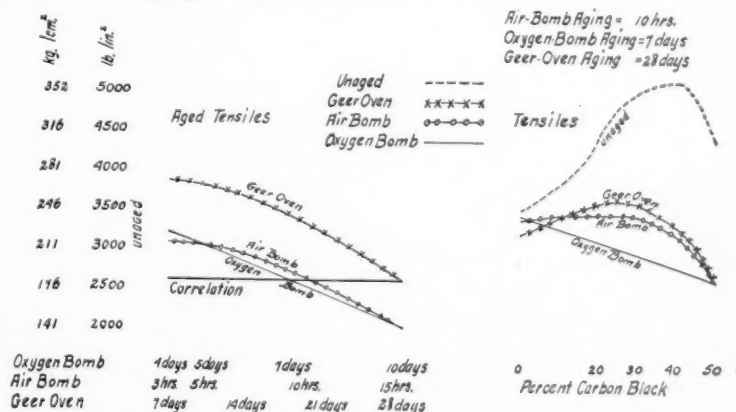


Fig. 4. Comparison of Oxygen-Bomb, Air-Bomb, and Geer-Oven Aging. Left, base stock, same as in Fig. 2. Right, same stock except carbon black varied from 0 to 50 parts. Cure, 60 minutes at 274° F. (134° C.).

<sup>4</sup> P. K. Schoenfeld, *Ind. Eng. Chem.*, 27, 571 (1935).



slight initial increase in tensile as the carbon black content is increased with a later decrease, but nevertheless the percentage loss in tensile increases progressively as the carbon black content is increased. The oxygen-bomb aging shows no increase as the carbon black content is increased. These results show that the correlation is not exact for these various aging methods when different amounts of carbon black are employed. However the air-bomb and Geer-oven aging are probably within the limit of experimental error.

In the last series of tests a comparison was made of the effect of several compounding ingredients on the aging of rub-

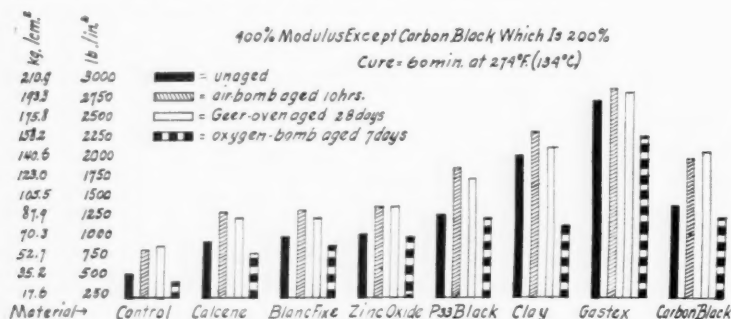


Fig. 5. Effect of Compounding Ingredients

Base stock, smoked sheets, 100.00; zinc oxide, 5.0; sulphur, 2.75; stearic acid, 3.0; pine tar, 2.0; accelerator, 1.25; antioxidant, 1.50. Added to base stock: A, control; B, calcene (CaCO<sub>3</sub> plus stearic acid), 50.0; C, blanc fixe, 50.0; D, zinc oxide, 50.0; E, P33 black (soft black), 50.0; F, clay, 50.0; G, Gastex (soft black), 50.0; H, carbon black, 50.0.

ber compounds. These results are shown in Figures 5 and 6. With carbon black it was necessary to show the 200% modulus figures, because in the Geer-oven and air-bomb aging the elongations were less than 400%. Figure 5 shows the modulus results unaged and after aging in the air bomb, oxygen bomb, and Geer oven. Each compound shows an increase of the aged modulus over the unaged modulus for air-bomb and Geer-oven results, while the modulus decreases after oxygen-bomb aging. Figure 6

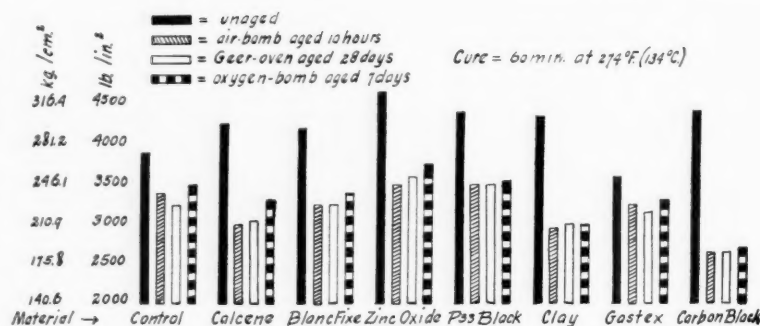


Fig. 6. Tensile Results with Compounds in Fig. 5

shows the tensile results obtained with the same compounds. These results show definitely that, irrespective of pigment used, the "modified" air-bomb aging conditions parallel the Geer-oven results, but show considerable variation from the oxygen-bomb results. In other words the higher temperature employed for a shorter length of time in the air-bomb has practically the same effect on continuing vulcanization and oxygen deterioration as is obtained in the Geer-oven tests.

### Conclusion

Data here presented demonstrate that study of tread compounds by the air-bomb aging method must include modifications of the conditions followed in the comparison of inner-tube compounds.

Data are presented which show the effect of air pressure, temperature, elongation, oxygen concentration, time, and pigment variation on the aging of rubber compounds.

The air-bomb aging conditions suggested for the study of tread compounds, consisting in testing at 0 elongation, 50 pounds air pressure per square inch (3.5 kg. per sq. cm.), and 220° F. (104.4° C.) temperature, have provided a shorter laboratory test which parallels the Geer-oven aging test in its effect on carbon black compounds.

## Vulcanization of Rubber

(Continued from page 38)

A clause in his 1843 contract with this company obligated it to perform experimental work on his applications, but as the firm was interested in making profit from manufacture and sale of articles it was licensed to make and for which there was good demand, this plan did not work out well. The company had no interest in promoting Goodyear's new ideas, and in view of manufacturing difficulties under the process, it had plenty of problems of its own to solve. These difficulties included fermentation of compounds in which solutions of rubber were used, faulty vulcanization because of lack of uniform heat in ovens under the dry-heat process, and worst of all, the blistering of goods from a variety of causes (use of old or acidified turpentine, use of acid sulphur, mixing of gas-generating substances in the compound, presence of water

in the compound, insufficient drying of turpentine from the compound before vulcanizing, too sudden application of a high degree of heat, etc.). These causes of trouble were so varied that they were most difficult to identify and guard against, but gradual progress was made, and by 1845 satisfactory vulcanized rubber goods, particularly the "metallic" rubber shoes, were at length being produced. Thus six years had passed between the date of the discovery and the date of its proven utility.

Meanwhile Goodyear had in 1843 applied for the patent which was granted for an "Improvement in India-Rubber Fabrics" on June 15, 1844; he had licensed additional companies to utilize his process, the protracted litigation with Day had begun, and other events had occurred which will be dealt with in a succeeding article.



# Partners in Industry

Laborers, Stockholders, Management, and Government

J. D. Tew

**A**T A time just before the Civil War, when there was a great danger that this whole country of ours might be torn apart, a great statesman, Daniel Webster, made the point that that was a good time for the leaders of the nation, like the captain of a ship at sea, to find out what their position was so that they might steer a safe course through the threatening storm.

Let us now look ahead to see where we are going and whether we are following a course that will lead to continuous employment in the future for the thousands who will follow us.

Right now we are living in a world which is in a turmoil. The World War dislocated the relations of all of the nations of the world. Impossible war debts compelled nations to repudiate their most solemn obligations. The longest economic depression in history threw millions of workers out of employment. For four years the great majority of all American corporations steadily lost money, and while a few continued to make money, the losses to investors in all corporations exceeded the profits not by millions, but by billions of dollars. Businesses that seemed impregnable were destroyed.

Just as in all history, the troubles of mankind produced a horde of witch doctors throughout the world, who held out glowing promises. As a result of following their fanatic theories, the old time-tried institutions crumbled. The very institution of democratic government disappeared in many countries.

In some countries the people even gave up their liberty, their freedom of thought, action, and speech to follow false prophets, promising them a cure-all for their ills. The only really free countries on earth today are the so-called capitalistic countries. Those which boast of some new panacea for all their difficulties are anything but free. Just stop and think this over.

It is up to you, me, and every other person sincerely interested in the future welfare of this country to discourage the adoption of new and unproved economic theories which are now so popular in many foreign countries. Advocates of new theories of government are trying to sell the people new panaceas. To the surprise of most of us there are some evidences that the compounders of these quack formulas are beginning to find a market for their medicine in this country.

But let us look at our own country and our own busi-

ness and see whether we stand in need of any of these theories which originated in countries far removed from the world in which we live and work here in Akron. From the standpoint of conditions of work and standards of living, an enormous number of workers in other countries are still struggling under conditions not so good as those which prevailed in America a hundred years ago. You and I are working in an industry that pays the highest average hourly wages not only in this country, but the highest that have ever been paid in any industry, in any country, at any time.

The average American worker has a higher standard of living than any other worker has or ever has had anywhere else in the world. The richest people in the world fifty years ago could not buy, with all their money, the things we have today—comfortable homes, good clothes, electric light, radio, automobiles, oil burners, modern plumbing, and numerous other things. Any evening, at a cost of a few cents, you can turn on the radio in your home and enjoy the finest entertainment the world affords. And yet, agitators scornfully scoff at this—the American Capitalistic System, which has made

**T**his article is a reproduction of excerpts taken from a talk given on May 3 by Mr. Tew, then president of The B. F. Goodrich Co., before the members of Goodrich Twenty-Year Club. The thoughts presented here might well apply to any industrial organization, large or small, which has successfully passed through the recent period of economic pressure and which must now face a readjustment era with a desire for due consideration of all who are vitally interested in its perpetuation.

all these things possible.

What is this capitalistic system? There is no mystery about it. In the case of the Goodrich company it simply means that we as workers are not limited, in what we produce or in what we can earn, to such tools as we could ourselves buy or such money as we could furnish to make the wheels go 'round.

Some of our friends love to picture great corporations as dominated by men of great wealth, trying to overcharge the public on the one hand and underpay the worker on the other. Actually, the tools with which you and I work are furnished by more than 24,000 people—the stockholders of the Goodrich company—mostly people like ourselves who have worked with their hands and heads; who have lived within their means; who have saved a little of their wages or salaries and who have said, "I think the Goodrich people must have loyal workers and sound management to have developed the business they have over a period of 67 years. I am going to invest my savings with them."

Every year these stockholders get together. We give them a report of how we have handled their business; we tell them what we have produced, what we have sold, what we have earned, to justify the continuance of the

partnership of their savings and our labor. When hard times come, they may have to wait a long time for any return on their investment, and during that time we may have to work harder or take less to keep going.

Twenty years' continuous employment means something more than just running a business from day to day. In time of depression these great corporations must be able to borrow money for raw materials and to meet the payroll. You don't always borrow it from the banks. Sometimes you put a mortgage on your business and issue bonds, and, in general, these bondholders are like the stockholders, people who have worked and saved and who have something left over for investment. You can't get that money at all unless you can show that workers, stockholders, and management over a long period of years have been able to work together to produce a good product, sell it at a profit, and earn something for the investor.

Let me say, this is not just a theory. Between 1918 and 1928, when there was no serious depression, thousands of companies went out of business because they could not manufacture a competitive product and sell it at a competitive price and make a profit. Therefore they could not get more capital. Every one of the hundreds of thousands of men and women who worked for those companies had to go out and look for another job.

There is another partner in all business. That partner is the government under which we live. Out of earnings—from stockholders', from yours and from mine—some money must necessarily go for the maintenance of that government. Therefore you have just as much interest in the conduct of government—city taxes, county taxes, state and federal taxes, as the people who have their money invested in this business. If the government is extravagant and taxes are unnecessarily high, there is less left for you and me. If government makes unreasonable rules that hamper the success of honest business effort, or that make it impossible to keep a fair reserve for hard times, that threatens continuous employment. You may regard taxes as something that only the stockholders pay, but last year the taxes we paid represented more than a dollar for every working day for every man and woman employed by this company.

There are many able and sincere men in all branches of government, but there are also a great many men who are trying to get or keep political jobs by telling the public, on the one hand, that they are going to keep down the cost of what they buy, and telling the worker, on the other hand, that they are going to raise his wages. This is obviously impossible and, therefore, you ought to take an active and interested part in letting people in public office know that you expect honest and sincere government for the money you are contributing to its support. And more than that, unless government—city, county, state and national—runs its business economically and properly, the stockholders, who are the voters, are going to ask for new management.

There is no mystery either in the management of business or in the management of government. Mismanagement in either case will wreck one as quickly as the other, unless the management is changed before it is too late.

## Pioneering Carbon Black

(Continued from page 41)

of rubber compounding. Messrs. Tew, Oenslager, and Kitchel were, however, most intimately associated with the early development of the American black tire.

While records are not available to show the extent of the research work which was conducted at Goodrich dur-

ing the period from 1909 to 1914 relative to the degree of reinforcement obtained from carbon black or the possible increase in percentage, its value had been proved to their entire satisfaction and the desirability of higher percentages had been established. It is definitely known that a few years after the merger of Goodrich and Diamond and as a result of economic pressure, Mr. Oenslager, presumably in 1914, developed a new tire tread formula containing a much larger amount of carbon black, and he found that the tread wear was very greatly improved.

Other manufacturers in the United States became aware of the superiority of the carbon black tread and gradually adopted it as their standard. Likewise its use spread rapidly to mechanical goods, footwear, and other black rubber products. During the passage of the years, as a result of the increased knowledge in compounding, the skilful use of various ingredients and the improvements in the quality of carbon black, it has been found possible to increase still further the per cent of carbon black with a consequent improvement in quality.

## Electro-Thread Wrapper<sup>1</sup>

THE Pastor-Jores system new electro-thread wrapping machine has many advantages over the usual machines for the purpose, particularly in regard to the actuation of the spindles because of the simple, practical construction.

The thread braking of the machine is done by the surrounding air which does not circulate with the spool, but is deflected through a fixed device acting on the thread as it runs off. For this purpose certain precision spools have been specially developed.

The number of revolutions of the right and left spindles can be directly and uniformly regulated electrically even at 20,000 r.p.m. and the number of revolutions of the spindle controlled by a transformer can be read at all times from a scale, controllable by a stroboscope.

The electro-spindles are comparatively simple in construction. The wrapping shaft has ball bearings.

The rate of delivery can be read during the operation from a tachometer scale in meters per minute and can be regulated electrically according to the quality of the thread. Each individual operation of the machine can be stopped electrically by pressing a Morse key which stops both spindle motors immediately by means of electrical braking. At the same time the delivery device is disengaged electro-magnetically without movement of any mechanical element.

The electro-wrapper permits all kinds of rubber thread, including ultra-fine latex threads, to be handled without difficulty. The finest and most sensitive covering material, whether cotton, natural or artificial silk and wool, mixed thread, etc., can be applied without difficulty.

The operating cost of the electro-wrapper is three times that of the usual machine with mechanical drive, but its output is four to six times greater.

It offers the possibility of utilizing with almost absolute security and with the least possible strain on the thread, textile materials hitherto worked with the greatest difficulty. The differences in the strength and thickness of threads is so great in modern textile materials that only those machines of precision construction and versatility of operation can be used economically. Other advantages of the electro-wrapper are: absolute uniformity and best quality of the product; positive regulation of the spindles and the thread delivery; saving in space and labor; and unusually high output capacity combined with comparative simplicity of servicing.

<sup>1</sup>O. Pennenkamp, *Gummi-Ztg.*, Mar. 20, 1936, p. 302.

# Impact Machine for Rubber Testing<sup>1</sup>

Determining the Stress-Strain Diagram at High Speed

Geo. J. Albertoni<sup>2</sup>

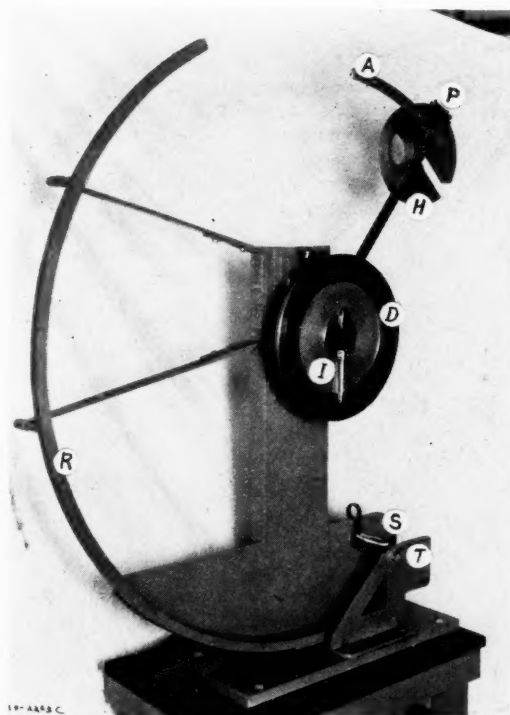


Fig. 1. General View of Machine

A. Arcuated member on which are directly indicated settings of pin used to trip releasing device at different elongations of test piece. D. Dials. H. Pendulum hammer. I. Indicator. P. R. Pawl and rack arrangement (used only for special purposes, pawls being normally kept in a lifted position). S. Pins securing test piece at proper position. T. Support, at back of which is secured the tripping mechanism.

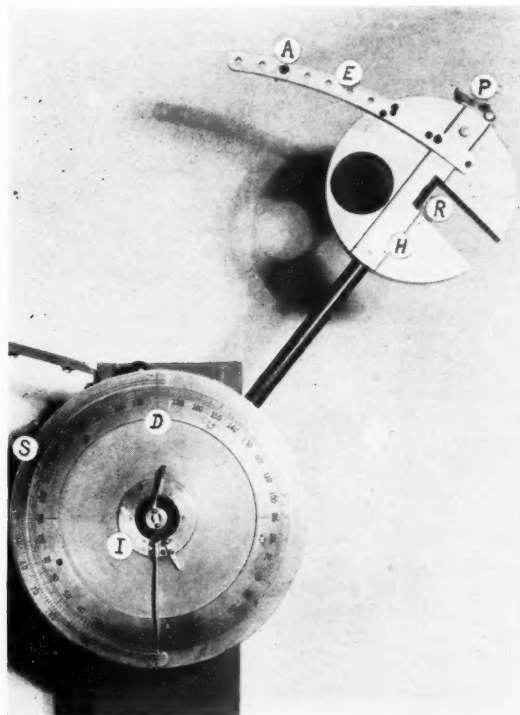


Fig. 2. Close View of Pendulum Hammer and Scales

A. Arcuated member attached to pendulum hammer. D. Degree scale (divided in tenths). E. Openings for holding releasing pin at different elongation settings. H. Pendulum hammer. I. Indicator arrangement and sliding supporting disk, pressed (at back) by a series of small springs. P. Pawls, with small adjusting cam. R. Roller at center of pendulum hammer, against which stretches central portion of lubricated test piece while pendulum advances. S. Scale for corrected readings of available kinetic energy of pendulum.

**I**N CONTRAST to the ordinary standard procedure at low speed various methods have been devised to carry out tensile tests of rubber under rapid application of load, with the purpose of securing more definite indications, at a speed in agreement with actual performance. The application of those methods to the study of the tensile properties of rubber stocks goes as far back as 1910, when Beadle and Stevens<sup>3</sup> made use of the pendulum to investigate these properties. Their work applied to rubber compounds of different compositions and different loadings.

More recently Van Rossem and Beverdam<sup>4</sup> presented a set of results tending to prove an optimum in the tensile properties, coinciding with the best cure as determined by practical observation.

However all experiments, previous to those here re-

ported, are limited to the determination of the tensile strength of rubber, and no attempt was made to extend the investigations to the determination of the resistance of rubber at different elongations.

The machine here illustrated is designed to measure not only the energy absorbed at break, under conditions of high speed, by impact, but also the stress-strain relation.

## General Features

Figure 1 shows a general view of the impact tester as

<sup>1</sup> Presented before the Division of Rubber Chemistry at the ninety-first meeting of the American Chemical Society, Kansas City, Mo., April 13 to 17, 1936. Reprinted from *Ind. Eng. Chem. (Anal. Ed.)*, 9, 1, 30-34 (1937).

<sup>2</sup> Goodyear Tire & Rubber Co., Akron, O.  
<sup>3</sup> C. Beadle, and H. P. Stevens, *Proc. Intern. Rubber Congr., London*, 1911, pp. 344-50.

<sup>4</sup> A. Van Rossem, and H. B. Beverdam, *Rubber Chem. Tech.*, 4, 147-55 (1931).

designed by the author and in use at the Goodyear Research Laboratories. The pendulum hammer and the test piece are in position ready for test. Figure 2 represents a close view of the pendulum hammer and scales.

**ELONGATION FEATURES.** The most important parts of the elongation system are the tripping device and the arcuated member secured to the pendulum hammer.

The method of securing the test piece to the machine consists in having one of the two supporting pins capable of dropping from position whenever the lock is set free by the impact of the elongation pin secured at the arcuated member of the pendulum hammer. The dropping pin supporting one end of the test piece is carried by a cylinder capable of rotating around a pinion. The method of arresting and releasing the rotor is illustrated by the detailed view of the tripping device (Figure 3).

To secure the release of the test piece at different elongations, an arc is attached to the pendulum hammer. To this arc is secured a removable pin, capable of releasing the tripping device at any prefixed elongation of the test piece. The arc carries a series of holes at such distances as to operate at zero elongation, at 50, 100, 150, and every 50% elongation up to 400%. On the present machine, holes are also provided for 10, 20, 30, 40%, and also for 450 up to 650.

Experimental determinations, carried out by the use of fine metallic wire of proper lengths secured with the rubber test piece in proper position for test, tend to demonstrate that the test piece is fully released at the elongation required.

In Figure 3 the arrows indicate the direction of the motions and illustrate the coordination of the movement of the arcuated member, with the release of the trigger.

**TEST PIECE.** Although different experiments were carried out, using the dumbbell test piece, the ring type was finally adopted for convenience. The rings are cut from the ordinary molded 2-mm. sheets, by the same procedure used for the dumbbell test piece. The diameter, measured at the middle of the width, is 7.0 cm.; the initial length is 11 cm. (half of the circumference). Figure 4 shows the three test pieces (6.3, 5, and 3 mm. in width) and the corresponding dies.

### Operation

The procedure to be followed in the operation of the machine can be considered in three ways:

1. Procedure required to obtain the maximum of accuracy necessary to calculate the full extent of the stress-strain curves. A new test piece is required for the determination of each point.
2. Simplified procedure sufficient to determine the energy absorbed by the test pieces at two elongations,  $a$  and  $b$  (preferably 100% apart), and to calculate the modulus at the elongation  $(a + b)/2$ .
3. Determination of the energy absorbed at break, to evaluate the relative tensile strength of the stocks and eventually their best cure.

Aside from the type of correction and the number of test pieces required, the method of operating the machine is substantially identical in all three cases. However in determining the tensile strength the use of the releasing pin, set at the arcuated member of the hammer, is

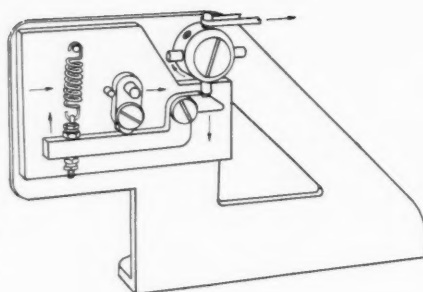


Fig. 3. Tripping Device

of the tripping device. Release the pendulum weight and record the readings of the dials.

In operating the machine, the pendulum ruptures or carries the test pieces to a definite elongation when near or at the bottom of the fall.

The difference between point  $H$ , from which the center of gravity of the pendulum is allowed to drop, and height  $H_1$ , to which it rises at the other side of the stroke, is proportional to the energy required to break or to elongate the test piece. The energy absorbed is equal to:

$$W(H - H_1)$$

where  $W$  = weight of the pendulum

### Construction Details and Calculation of Results

The total drop height and available drop heights of the pendulum hammer, when due allowance is made for frictional resistances, are:

Distance of the center of gravity from the axis of rotation, 56.6 cm.

Maximum pendulum deviation from the vertical,  $142.3^\circ$ ; total drop height, 101 cm.

Available drop height when correction is made for bearing and air resistance and for frictional resistance of the pointer, 100 cm.

Available drop height when further correction is made for the resistance due to the tripping device, 98.5 cm.

On the dial for the direct reading of the per cent energy absorbed, when the elongation device is used, the graduation of the scale represents the drop in centimeters of the center of gravity of the hammer from 98.5 cm. above its lowest position.

Hammers of different weights were adopted on account of wide differences in resistance of the rubber stocks. The three weights used are 4,077, 10,695, and 13,325 grams. They are quickly interchangeable, being constructed of overlapping sections. Figures 1 and 2 illustrate a single-weight hammer of 10,695 grams.

The average dimensions of the three test pieces used are as follows: mean diameter of all three ring test pieces, 7.0 cm.; width, 6.3, 5.0, and 3.0 mm.; volume per millimeter of thickness, 1.38, 1.08, 0.65 cc., respectively; average gage, 1.8 mm.

The factors for the calculation of the energy absorbed per unit volume of the test piece, from calculations are as shown in the tabulation on the following page.

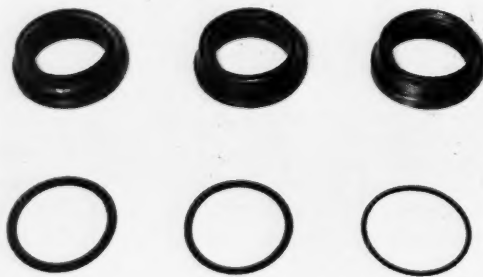


Fig. 4. Test Pieces and Dies



Test Piece (1.8-Mm. Gage)	Vol. Cc.	Factors for:		
		4.08-Kg. Wt.	10.69-Kg. Wt.	13.3-Kg. Wt.
Width Mm.		Kg. Cm. per Cc.		
6.3	2.49	1.61	4.23	5.26
5.0	1.95	2.06	5.40	6.72
3.0	1.17	3.43	9.00	11.20

The factors, based on the equivalence of results, from experimental data are:

Test Piece (1.8-Mm. Gage)	Vol. Cc.	Factors for:		
		4.08-Kg. Wt.	10.69-Kg. Wt.	13.3-Kg. Wt.
Width Mm.		Kg. Cm. per Cc.		
6.3	2.49	1.7	4.23	5.2
5.0	1.95	2.0	5.3	6.5
3.0	1.17	3.3	8.7	10.8

The actual drop height of the hammer at different elongations is:

Elongation %	Drop Height Cm.	Elongation %	Drop Height Cm.	Elongation %	Drop Height Cm.
20	95.2	300	99.8	500	96.2
100	96.9	400	98.4	600	94.9
200	98.1				

For ordinary determinations this correction is generally not required but was applied in calculating the results illustrated here.

The correction for frictional resistance of the test piece, at the pins, was calculated as the energy absorbed at no elongation by releasing the tripping device at such position, and recording the energy absorbed. This determination is desirable to establish the operating condition of the machine and the characteristics of the stock tested. The values range between five and seven kg. cm. per cc., according to the type of stock. The results are very uniform when the test piece is previously lubricated as indicated under "Operation."

The striking velocity of the pendulum hammer is calculated from the equation

$$V = \sqrt{2GS}$$

where  $V$  = velocity at end of time  $t$ , sec.

$S$  = vertical space traversed in time  $t$  (100 cm.)

$G$  = acceleration of gravity (980)

$$V = \sqrt{2 \times 980 \times 100}$$

$$= 443 \text{ cm. per sec.}$$

$$= 26,580 \text{ cm. per min.}$$

$$= 10 \text{ miles per hour.}$$

The calculation of the stress-strain curves (in kg. per sq. cm.) from the relation between elongation and energy absorbed (in kg. cm. per cc.) is made as follows:

The area under the stress-strain curves can, with sufficient degree of approximation, be divided into a series of trapeziums. The number of kg. per sq. cm. at  $E$  % elongation =  $I$  (kg.

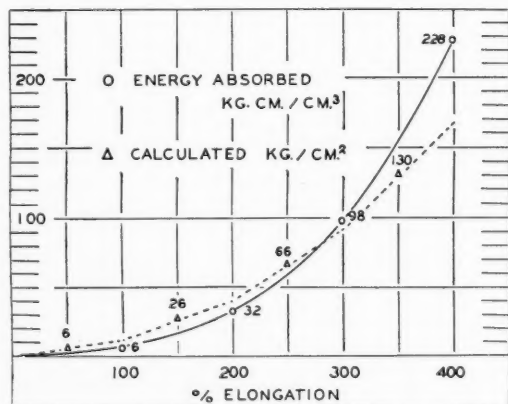


Fig. 5. Calculation of Kg. per Sq. Cm. Values from Energy Absorbed (Kg. Cm. per Cc.)

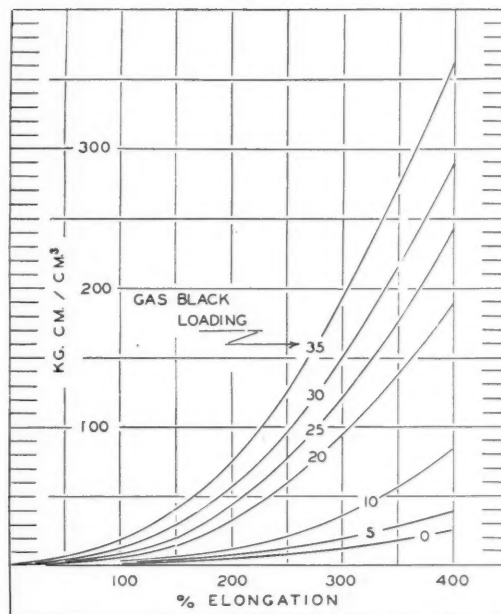


Fig. 6. Energy Absorbed at Low Speed  
50 cm. per minute, by usual methods.

cm./cc. at elongation  $E + A$ ) — (kg. cm./cc. at elongation  $E - A$ ) multiplied by  $100/2A$ .

The area under the curve representing kg. cm. per cc. between 0 and 50% elongation can be considered as a triangle. The number of kg. per sq. cm. at 25% elongation can be considered equal to the number of kg. cm. per cc. at 50% elongation.

Figure 5 illustrates graphically the procedure used to calculate the stress-strain curve from the values of kg. cm. per cc.

### Experimental Applications to Vulcanized Rubber

The following is a series of tests applied to vulcanized rubber. No attempt is made to illustrate the application of the machine to uncured stock.

**COMPOSITION AND CURE.** The composition of the stocks tested was as follows:

Stock No.	V-92	V-93	V-94	V-95	V-96	V-97	V-98
Rubber	100	100	100	100	100	100	100
Gas black	None	9.4	18.8	37.5	47.1	56.4	65.8
Zinc oxide	5	5	5	5	5	5	5
Sulphur	3	3	3	3	3	3	3
Stearic acid	4	4	4	4	4	4	4
Captax (mercaptoben-zothiazole)	0.35	0.50	0.80	1.2	1.3	1.3	1.3
Vol. gas black loading	0	5	10	20	25	30	35

Cures were 35, 50, 70, 100, and 140 minutes at 260° F. The best cure, as judged by tear and practical observation, was 70 minutes. Therefore in the following tests (except for the application of the impact test to the determination of the best cure), only the 70-minute cure was represented.

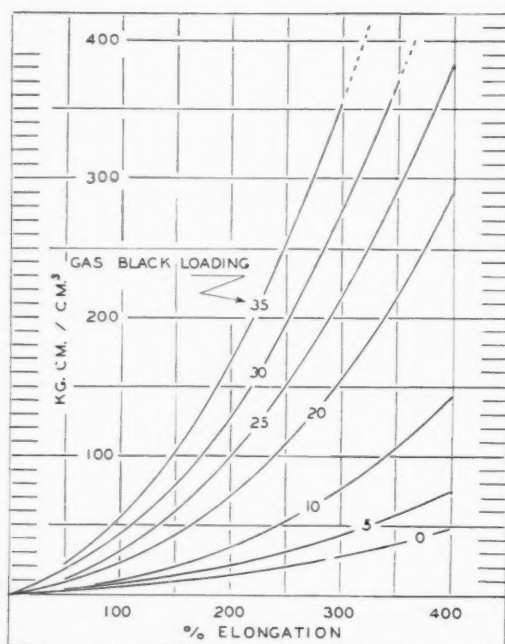
**ELONGATION AND ENERGY ABSORBED.** The relation between elongation and energy absorbed at low speed by the usual methods and at high speed by impact is shown in Figures 6 and 7. The comparison between energy storage capacity at 50 and at 25,000 cm. per minute is given in Table 1.

**STRESS-STRAIN DATA.** The stress-strain curves by impact, calculated from the relation between elongation and

TABLE 1. ENERGY ABSORPTION (KG. CM. PER CC.) GAS BLACK LOADINGS, VOLUMES

Elongation %	Gas Black Loadings, Volumes													
	0		5		10		20		25		30		35	
	50a	25,000a	50a	25,000a	50a	25,000a	50a	25,000a	50a	25,000a	50a	25,000a	50a	25,000a
50	..	3	1	4	1	6	2	8	3	13	5	17	7	24
100	1	6	2	9	3	12	5	22	8	32	13	43	19	57
150	2	10	4	14	6	20	15	42	20	58	30	79	41	103
200	4	14	8	21	12	34	33	70	44	98	57	128	76	166
250	8	21	12	31	21	52	60	108	78	149	97	196	126	250
300	12	27	20	43	36	76	96	156	122	214	149	278	192	354
350	18	36	28	58	58	108	140	217	178	296	216	370	272	...
400	26	48	40	76	86	144	190	290	244	384	290	...	364	...

a Cm. per minute.

Fig. 7. Energy Absorbed at High Speed by Impact  
25,000 cm. per minute.

energy absorbed, are given in Figure 8. The stress-strain data calculated from Table 1 are as follows:

Elongation %	Gas Black Content, Volumes:							
	0	5	10	20	25	30	35	
25	3	4	6	8	13	17	24	
100	7	10	14	34	45	62	79	
150	8	12	22	48	66	85	109	
200	11	17	32	66	91	117	147	
250	13	22	42	86	116	150	188	
300	15	27	56	109	147	174	...	
350	21	33	68	134	170	...	...	

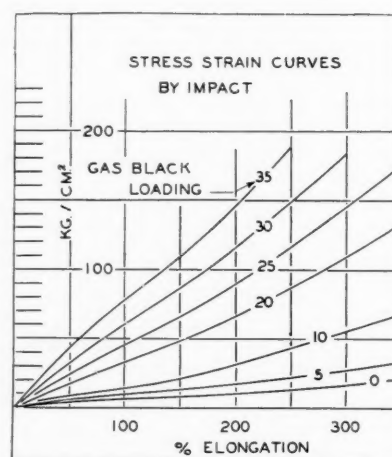
**SIMPLIFIED DETERMINATION OF ENERGY ABSORPTION AND MODULUS.** A simplified procedure limited to the determination of the energy storage capacity at 250 and 350% elongation and to modulus at 300% is shown in Figure 9 and in Table 2.

TABLE 2							
Elongation %	Gas Black Content of Stock, Volumes:						
	None	5	10	20	25	30	35
350	11.3a	16.9a	28.8a	55.3a	58.8a	44.5a	(52)a
250	7.7a	10.4a	15.4a	29.0a	30.9a	24.4a	30.7a
Test Piece Width, Mm.:							
	6.3	5	3				
Experimental Factors							
	4.2	5.3	8.7				
Energy Storage Capacity							
350	47b	71b	121b	232b	312b	387b	(452)b
250	32b	44b	65b	122b	164b	212b	267b
Modulus							
300	15c	27c	56c	110c	148c	175c	185c

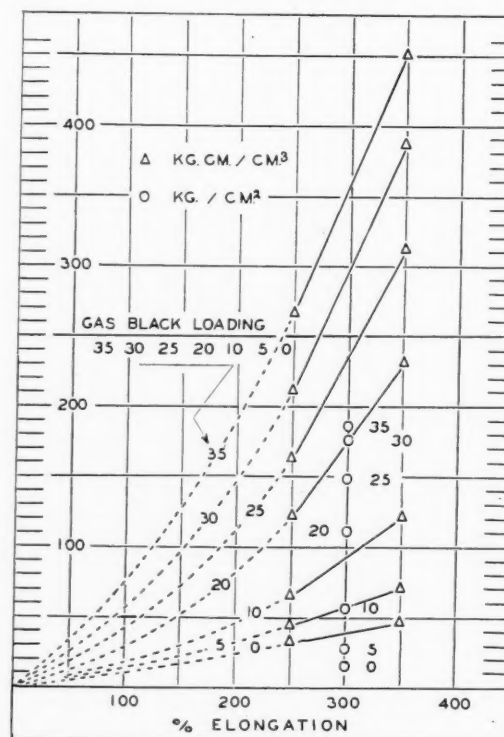
a Scale reading (% energy absorbed).

b Values marked a multiplied by the corresponding factors.

c Modulus (kg. per sq. cm.), calculated from values marked b.

Fig. 8. Stress-Strain Relations by Impact  
Kg. per sq. cm. calculated from kg. cm. per cc. values.

**ENERGY ABSORPTION AT BREAK.** The energy storage capacity at break in relation to best cure is shown in Fig-

Fig. 9. Energy Absorbed by Impact  
At 250 and 350% elongation and calculated modulus at 300.

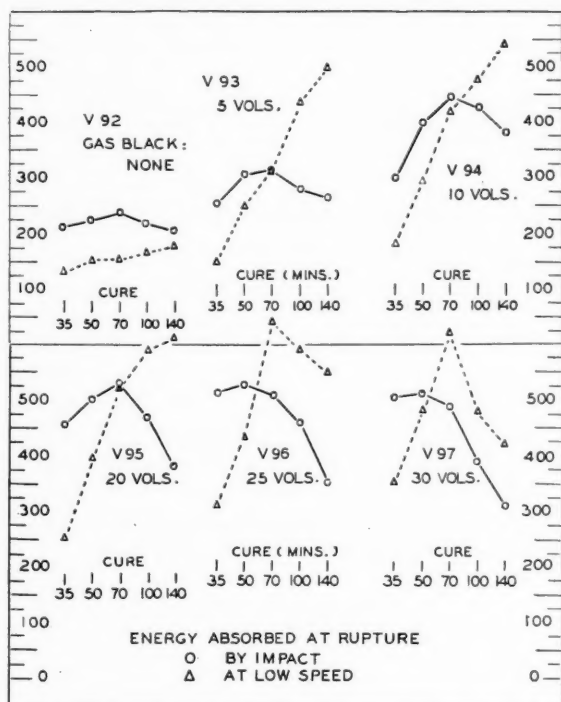


Fig. 10. Energy Absorbed at Rupture, in Relation to Cure

ure 10.

Probably one of the most useful applications of the impact test is the determination of the best cure, from the standpoint of energy storage capacity. The difference between cure is, in some cases, not very accentuated and almost on the limit of the errors involved in the test. However the general trend is, in most cases, sufficient to indicate the true value of the best cure.

Following is a comparison of results obtained at 50 cm. per minute with those at more than 25,000 cm. by impact; the cures were 35, 50, 70, 100, and 140 minutes at 260° F.:

Stock No.	Gas Black Loading Vol.	Ratings in % of Lowest Cure Values							
		At Low Speed				By Impact			
		50- Min.	70- Min.	100- Min.	140- Min.	50- Min.	70- Min.	100- Min.	140- Min.
V-92	None	116	118	128	132	108	113	106	101
93	5	169	228	295	340	118	123	110	104
94	10	163	234	267	297	132	152	146	126
95	20	157	207	237	243	110	116	104	83
96	25	140	206	192	178	104	99	90	68
97	30	131	178	138	119	100	98	77	62
98	35	128	147	128	112	99	97	75	47

#### Acknowledgment

The author desires to express his thanks to R. P. Dinsmore and L. B. Sebrell for permission to publish this paper, and to W. W. Vogt and M. J. DeFrance for valuable criticism.

### Mill Mixing Device

**M**ECHANISM for more thoroughly manipulating rubber compound from the bank while mixing has been patented<sup>1</sup> recently. The material is scraped from the roll and returned to the bank automatically, by a scraper blade D having its active edge *d* contacting with the roll

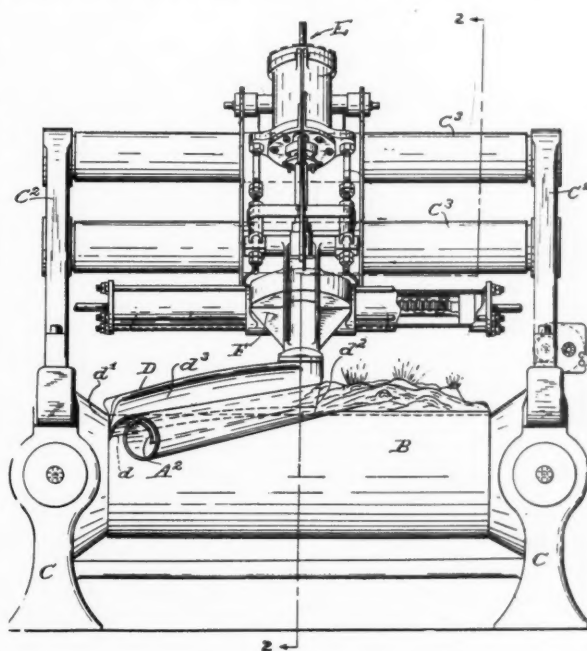
B on a line oblique to the straight line elements thereof, the blade, at its forward or leading end *d*<sup>1</sup>, coinciding with or extending beyond the end of the roll, and at its rear or trailing end *d*<sup>2</sup> terminating somewhat beyond the middle or center line of the roll. The lateral faces *d*<sup>3</sup> of the scraper are curved outwardly from the active edge *d* which contacts with the roll, somewhat in the nature of a plow. Preferably the edge *d* of the scraper blade is formed of Monel metal, to reduce wear from contact with the surface of the roll to a minimum.

The scraper blade D has two active positions, one at each end of the roll B, and is swung from one position to the other at suitable time intervals. When the blade D is in contact with the left end of the roll, the coating of rubber at that end is caused to roll up in a series of loose convolutions A<sup>2</sup>, and the rubber which is removed is drawn again into the bank endwise of the convolutions and around the rear or trailing end *d*<sup>2</sup> of the scraper by the rubber remaining in contact with the roll at the right end thereof.

When the scraper D has been in contact with the roll B at one end for the proper length of time, it is raised and swung through an arc to a corresponding position at the opposite end of the roll, whereupon it is again lowered to perform its scraping function at the opposite end of the roll.

The scraper is lowered and raised into and out of active position by hydraulic mechanism E, and a rocking support member F upon which the scraper D is mounted, the mechanism E and member F being supported by a superstructure mounted on the framework of the mill proper. The superstructure includes a pair of bridge members C<sup>2</sup>; each bolted at the front and back to one of the end roll supporting members C of the mill and connected together by a pair of spaced hollow bars C<sup>3</sup> extending lengthwise above the mill rolls and between the bridge members C<sup>2</sup>.

The general objectives of this invention are to increase uniformity, speed up the mixing operation, retard the generation of heat and reduce the cost of the operation.



Rubber Mixing Mill

<sup>1</sup> U. S. patent No. 2,067,458, Jan. 12, 1937.

# Editorials

## Light, Safety, and Production

**A**BUNDANT well-arranged lighting not only enhances the comfort and well being of the factory operator, but it definitely increases the productivity of his efforts both directly and indirectly. Unobstructed daylight is the ideal form of illumination, but, unfortunately, particularly in the older types of mill construction, the directing of an adequate supply at proper places is impossible. So it becomes necessary to utilize to some extent artificial light throughout the day in practically every manufacturing plant.

General rather than local lighting tends to eliminate shadows and areas of semi-darkness and thus reduces the fatiguing eyestrain which otherwise results from the frequent readjustment of the pupil of the eye when looking from the workbench to surrounding objects illuminated in varying degrees of light intensity. Quite often it is not economical or practical to provide adequate intensity through general lighting methods, and it becomes necessary to augment this plan with a local lighting arrangement. In such cases either direct or reflected glare on the eye should be avoided, and the variation in intensity should not be too pronounced.

Besides the comfort and personal satisfaction to the operator, adequate and proper illumination provides a multifold financial return on the necessary investment and maintenance. The liability for accident and personal injury, costly through compensation, interruption of production, and the required training of a substitute worker, is decidedly reduced. It has been estimated that 15 to 25% of all industrial accidents are due wholly or in part to poor illumination. Loss due to damaged machines, raw materials, or goods in process is definitely less when the operator has full and distinct vision of his work.

Concentration and the desire for quality workmanship are also aided by the absence of nervousness which often results from eyestrain. Physical tiredness can be overcome by a night of rest, but nervous exhaustion has a tendency to accumulate over a period of time. The operator's effectiveness is retarded by any such strain and his continuity of performance is definitely shortened.

In addition to the above more or less indirect influences of inadequate lighting the direct efficiency of the worker is materially decreased and the percentage of overhead per unit of production is increased through supervision and in many cases machine-idleness.

This phase of industrial advancement becomes not merely a question of good working conditions from the employee's standpoint, but it has a real tangible significance with monetary value and it is worthy of concentrated, intelligent consideration.

## Substitutes for Rubber

**T**HE consumption of rubber and rubber products is increasing continually. Rubber, either crude or synthetic, forms the base around which compounds are being so developed that application to many new uses is being made possible. While synthetic rubbers are commonly considered as possible substitutes for crude, their characteristics appear to be such as to make them less desirable for some purposes and superior for others.

General impressions are that the price differential between synthetics and crude is the limiting factor in further substitution, but that the price of synthetic rubbers will decrease as consumption increases.

The question arises as to the cost of production if synthetic rubber could be manufactured in quantities equal to 75 or possibly 100% of the crude rubber consumption. Mass production often produces startling results, and it may not be beyond the realm of possibility that, if manufactured in quantities approaching present crude consumption, the price might be at least competitive.

Then, too, is it not possible that the product may be further improved or compounding technique advanced so that practical substitution can be made to a very high percentage? The possibility of accomplishment cannot now be foretold, but further strides are quite probable.

Reclaimed rubber by nature does not lend itself to full substitution for crude, but with improved processes and resulting products higher percentages are quite within expectation. According to a recent announcement by the Department of Commerce, reclaim capacity in the United States has been increased 8.4% since October 1, 1936, with a further projection of 15% by January 1, 1938.

If continued promotion of new uses for rubber products is to be realized, the selling price of the finished article and of crude rubber or its equivalent must be kept at a reasonable level. The probability of increasing substitution for crude rubber will undoubtedly have a pronounced effect upon the consumption of crude unless an ample supply and an attractive price is maintained. Should an emergency cessation of supply or inflated prices of crude rubber develop, synthetics would then be produced on a larger basis and substitutions would be greatly extended. Once adopted, such practice will most surely forge ahead rather than recede.

*S. C. Stillwagon*

EDITOR



# What the Rubber Chemists Are Doing

## A. C. S. Rubber Division Activities

### A. C. S. Fall Meeting

THE Rubber Division will meet with the American Chemical Society at its next meeting in Rochester, N. Y., during the week of September 6, 1937. The division plans to hold its meetings on September 9 and 10 at the Powers Hotel, headquarters for the division. It is suggested that those members planning to attend the Rochester meeting make their reservations as soon as possible.

The dead line for receiving papers to appear on this program will be July 14. Those planning to appear on the program should forward the papers to the Chairman of the Papers Committee, A. R. Kemp, Bell Telephone Laboratories, 463 West St., New York,

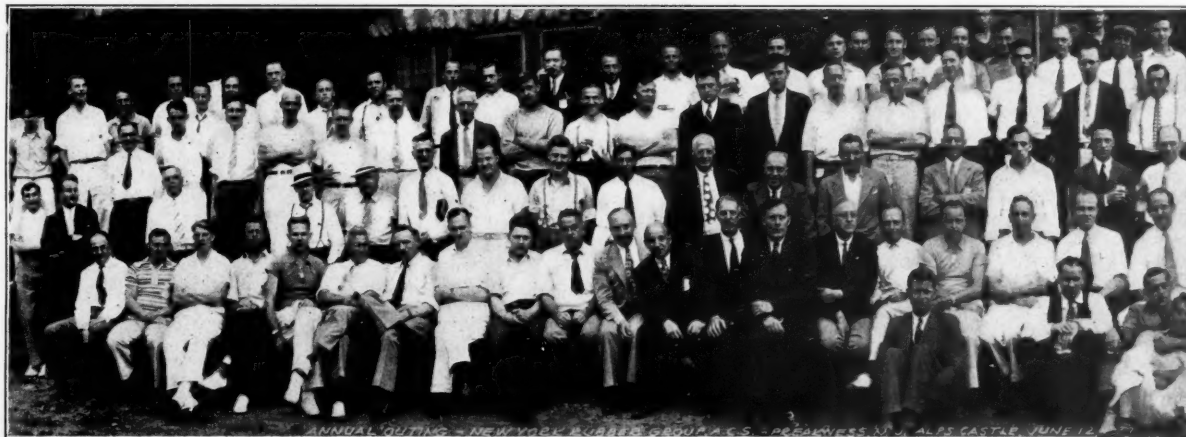
N. Y. Mr. Kemp would appreciate having information regarding the papers just as soon as possible in order that he may make definite reservations as to the number of sessions needed on the program. It is necessary to furnish four copies of each paper that is submitted for the meeting, *together with an abstract* of the paper of 200 words or less.

### New York Group

THE fourth annual outing of the New York Group, Rubber Division, A.C.S., held on June 12 at Alps Castle, Alps Road, Preakness, N. J., was thoroughly enjoyed by 396 members and guests throughout the day, replete with sunshine and athletic activities. The

very successful program of sports arranged by Chairman W. W. ("Bill") Higgins, United Carbon Co., 350 Fifth Ave., New York, N. Y., and his committee consisted of golf, boccie, softball, tennis, and horseshoe pitching.

Many participated in the golf tournament which got under way early in the day. R. J. Ozel, United States Rubber development department, Passaic, N. J., shot a low gross score of 77 to win the silver trophy donated by the United Carbon Co., Charleston, W. Va. Other prizes were awarded to Frank Woznick, Irvington Varnish Co., for obtaining two birdies; C. A. Anderson, Manhattan Rubber Mfg. Division, Passaic, for low net score; and Fred Traflet, Pequannoc Rubber Co., Butler, N. J., for high score. H. D. Bainbridge and



Among Those Present at the New York Group Outing, June 12

Smoly, International Smelting & Refining Co., won the team prize.

In the tennis tournament R. K. Oppen, U. S. Rubber Products, Inc., Passaic, N. J., won the trophy supplied by *The Rubber Age*, (New York), and Mr. Aishton was a worthy opponent in the finals. At bocce, the interesting Italian bowling game, Charles A. Finkel and John Pierro captured the trophy presented by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and second prize was won by W. F. Tuley, of Naugatuck Chemical, Naugatuck, Conn., and A. W. Meyer. More than 60 participated in the horseshoe contest in which William Lamela, of Okonite Co., Passaic, won the beautiful thermos jug donated by the Flintkote Co., East Rutherford, N. J. L. W. Moore, of U. S. Rubber mechanical factory at Passaic, was second, and A. W. Meyer was runner-up.

The softball tournament was taken very seriously as nine companies were represented by teams, and the elimination lasted till 4:30 p.m. As at last year's outing, Du Pont and Overman Tire Co., Belleville, N. J., contended in the finals for the loving cup which was furnished by INDIA RUBBER WORLD. Overman Tire Co. won again for the second consecutive year, Du Pont having taken possession of it in 1935.

At 4:00 p.m. the first group sat down to a fine chicken dinner, and the overflow waited for the second table. Boxing matches were held meanwhile, and two group pictures were taken.

After dinner a fine array of door and athletic contest prizes in addition to the regular trophies were awarded. These prizes were made possible by generous donations from the following contributors: Baker-Perkins Co., Binney & Smith Co., Godfrey L. Cabot, Inc., R. E. Carroll, Inc., Container Corp. of America, Farrel-Birmingham Co., Inc., General Atlas Carbon Co., Naugatuck Chemical Div., U. S. Rubber Products, Inc., New Jersey Zinc Sales Co., INDIA RUBBER WORLD, *The Rubber Age*, United Carbon Co., Flintkote Co., E. I. du Pont de Nemours & Co., Inc., Pequannoc Rubber Co., Rare Metal Products Co., Henry L. Scott Co., Southeastern Clay Co., Stamford Rubber Supply Co., R. T. Vanderbilt Co., Vansul, Inc., C. K. Williams & Co., and Wishnick-Tumpeper, Inc.

To the members of the New York Group and its guiding personnel during the past four years, great credit is due for the increasing enthusiasm which exists as is evidenced by the attendance at the annual outings held June 30, 1934, 86; June 15, 1935, 200; June 13, 1936, 336; and June 12, 1937, 396.

### Akron Group

THE Akron Group Rubber Division, A. C. S., outing held June 18 at the Silver Lake Country Club was a grand success with an attendance of nearly 350 members and guests. The main event of the day was a golf tournament in which 200 golfers participated.

Three prizes were awarded: the first, an eight-day strap watch donated by Godfrey L. Cabot, Inc., Boston, Mass., was won by Henry D. Bainbridge, of Anaconda Zinc Sales Co., East Chicago, Ill., for the longest drive on No. 1 tee, his total score being one under par; Henry O. Newman, of The B. F. Goodrich Co., Akron, O., received the second prize, a duffle bag donated by the C. P. Hall Co., Akron, for the nearest approach shot on No. 17 tee, a long par three hole; and the third, a duffer prize for the worst get-off on No. 1 tee, was won by L. V. Cooper, of Firestone Tire & Rubber Co., Akron, a dozen golf balls donated by White & Co., Akron. A loud speaker was installed on No. 1 tee to aid in giving explicit instructions to the boys as they drove off.

V. L. Smithers, of V. L. Smithers, Inc., assisted by Walter Voth, of the Akron Standard Mold Co., both of Akron, acted as master of ceremonies at the dinner. Approximately 150 beautiful prizes were donated for which drawings were held. R. E. Cartledge, of Midwest Rubber Co., Chicago, Ill., was in charge of the distribution of prizes, which were donated by the following companies: Adamson Machine Co.; Akron Chemical Co.; Akron Paint & Varnish Co.; Akron Standard Mold Co.; American Cyanamid & Chemical Corp.; American Mineral Spirits Co.; American Zinc Sales Co.; Anaconda Zinc Sales Co.; Binney & Smith Co.; Bridgwater Machine Co.; Godfrey L. Cabot, Inc.; Canfield Oil Co.; Cannon Mills, Inc.; Columbia Alkali Corp.; Poncet Davis Co.; Dill Mfg. Co.; E. I. du Pont de Nemours & Co., Inc.; Russ Farley; Farrel-Birmingham Co., Inc.; Firestone Tire & Rubber Co.; Forbes Varnish Co.; General Atlas Carbon Co.; General Tire & Rubber Co.; B. F. Goodrich Co.; Goodyear Tire & Rubber Co.; C. P. Hall Co.; Stanley Harris; Herron & Meyer; J. M. Huber, Inc.; Imperial Oil & Gas Products Co.; INDIA RUBBER WORLD; Inland Mfg. Co.; Inland Rubber Co.; Johnson Rubber Co.; F. F. Meyers; Midwest Rubber Reclaiming Co.; Monsanto Chemical Co., Rubber Service Laboratories Division; National Rubber Machinery Co.; National-Standard Co.; Naugatuck Chemical Div., U. S. Rubber Products, Inc.; New Jersey Zinc Co.; Ohio Rubber Co.; Philadelphia Rubber Works; R.C.A. Rubber Co.; Republic Rubber Co.; St. Joseph Lead Co.; A. Schrader's Son; A. Schulman, Inc.; Seiberling Latex Products Co.; Seiberling Rubber Co.; V. L. Smithers, Inc.; Rob Sperry; Superior Zinc Corp.; Titanium Pigment Corp.; United Carbon Co.; R. T. Vanderbilt Co.; Vultex Rubber Co.; Wellington Sears Co.; White & Co.; Wishnick-Tumpeper, Inc.; Xylos Rubber Co.

### Boston Group

FRIDAY, August 13, will be a lucky day for some members of the Boston Group, Rubber Division, A. C. S., and for some others, not so lucky. In either case a good time is promised to

those who attend the annual outing to be held at Fieldston in Marshfield, Mass., which is located on the ocean.

Outdoor sports of all kinds will be provided including golf at the championship course of the Marshfield Country Club, swimming on a private beach or in an outdoor pool, quoits, etc. The Boston Group has challenged the Rhode Island Rubber Club to a baseball game, but considerable difficulty is being experienced in finding an umpire who is willing to take a chance on "Friday the thirteenth."

Billy Hill, of the Remington Arms Co., who recently won the professional trap shoot for the State of Massachusetts, will give an exhibition of fancy rifle and shotgun shooting. Plans are being made for a speaker, but to date arrangements have not been completed.

The committee reports that in the event of rain, ample facilities are available for inside recreation including six excellent bowling alleys, a rifle range, and ping pong tables. Tickets, which include the banquet, will be \$2 each, and the greens fee for golf is \$1. Further details will be published in the August issue of INDIA RUBBER WORLD or may be obtained by writing to George W. Smith, group secretary-treasurer, P.O. Box 11, Winchester, Mass.

### Rhode Island Rubber Club

THE summer meeting of the Rhode Island Rubber Club was held at the Pawtucket Golf Club on June 4 and proved a decided success with an attendance of over 150 members of the trade including many from New

York, Boston, and other points outside the state.

The afternoon was devoted to a golf tournament for which a large number of fine prizes were provided. E. B. Curtis, of R. T. Vanderbilt Co., captured the low gross prize for non-members with the impressive score of 76. In this class E. M. Rupert was runner-up, and Leonard Yates, third. Roy Edson won the net prize for non-members with T. Simpson second and G. E. Wilson third. H. E. Thompson had low gross for members; R. A. Watt, was second, and R. Newell,



R. I. Club  
Golf Trophy

(Continued on page 71)

# Editor's Book Table

## NEW PUBLICATIONS

**"Electrical and Mechanical Flow Meters."** The Bristol Co., Waterbury, Conn. This 40-page catalog describes instruments for recording, integrating, controlling, and indicating the flow of steam, liquids, or gasses. Details are given regarding the new electric flow meter and its operation, using the meter principle of telemetering. Also, complete information is included on mechanical flow meters. The publication contains useful engineering data for reference.

**"Goodrich Batteries for Marine Service."** The B. F. Goodrich Co., Akron, O. This 24-page booklet contains six pages giving complete replacement data for batteries in marine service on standardized and express cruisers, and standardized runabouts, sedans and open boats, as well as for America's leading gasoline marine engines. The booklet also describes the Goodrich Kathanode Electro-Pak batteries for marine service, pointing out how the exclusive top cover protects the battery from salt spray and water, danger of short circuits by tools or other metal objects, and the formation of dirt and acid film. Other Goodrich batteries, including the Super-Electro-Pak, heavy duty batteries, power and lighting batteries, and other types are described and illustrated with complete specifications given, and the details of construction clearly set forth.

**"Electric CO<sub>2</sub> Meters."** Catalog 3,005. The Brown Instrument Co., Philadelphia, Pa. This 24-page catalog points out how CO<sub>2</sub> determinations act as a guide for boiler room operation. A chart compares the per cent CO<sub>2</sub> in the flue gases with the per cent preventable fuel loss. Several pages are devoted to schematic diagrams illustrating the operating principles and describing the passage of flue gas through the various units. The complete line of indicating and recording CO<sub>2</sub> meters are listed as well as the combined CO<sub>2</sub> and the gas temperature recorders.

**"Tested High Quality Packings."** Metalastic Mfg. Corp., Hackensack, N. J. This 16-page catalog describes an extensive line of coil and formed ring packings for use in connection with chemical manufacture, higher temperatures, and steam pressures as well as extensive use in oils, gasoline, and petroleum derivatives. The catalog contains copious illustrations, a handy table for converting common fractions into decimals and millimeters, and a page of mensuration formulae.

**"Tractor and Implement Tire Handbook."** B. F. Goodrich Co., Akron, O. 44 pages. The booklet describes the advantages of pneumatic tires on tractors and farm service implements, including more work at higher speeds, lower ground pressure and less intense packing of the seed bed, reduced rolling resistance, higher draw bar pull, easier riding, less vibration and consequent greater life of equipment, reduction of dust, and less destruction of turf and crops. One of the important features of these farm service tires is the use of the newly developed "Sun-Resisting Rubber" which adds considerable life to the tires. There are 20 pages of detailed data and specifications for pneumatic tires on farm implements.

**"Industrial News."** Vol. VII, No. 4. April, 1937. The Gates Rubber Co., Denver, Colo. This four-page house organ contains a small cross section sample of the new Vulco Rope V-belt and several comparative before-and-after photographs showing where this new V-belt has replaced ordinary flat belts and chain-sprocket drives. The outstanding feature of the Vulco Rope is the use of rubber-filled cord in place of the usual untreated cords.

**"Falk Steelflex Couplings."** Bulletin 4100. The Falk Corp., Milwaukee, Wis. This bulletin in 36 pages describes the detail of design showing the spring groove couplings, grid spring, and the coupling cover. The important feature is the grid spring made of chrome vanadium steel of high elasticity and tensile strength of which the main advantages are the shock absorption and compensation for misalignment. The coupling cover assures retention of the lubricant and exclusion of dirt and other foreign materials. The bulletin covers specification, design, rating, method of selection, and dimensions of the various couplings as well as many photographs of installations.

**"Guards and Safety Devices."** Francis Shaw & Co., Ltd., Corbett St., Manchester, England. Well illustrated descriptions of safety devices and guards, applicable to mills and calenders, are presented in this 12-page leaflet. In no case do the guards impede the operator in his work. The open work construction permits full view of the working parts. Also illustrated is a locking mechanism to prevent the opening of an electric tire press until the airbag is exhausted.

**"Productivity as a Remedy for Inflation."** Booklet-Editorial No. 21 by Allen W. Rucker in collaboration with N. W. Pickering, president of Farrel-Birmingham Co., Inc., Ansonia, Conn. This 16-page pamphlet compares the relative production efficiency, based on men per \$100,000 value added by manufacture in several basic industries, with total employment. Three economic periods are contrasted: Prosperity Period, 1923-29; Depression Period, 1929-33; and Recovery Period, 1933-36. The conclusions drawn are that employment is most secure in the industries noted for improved equipment and methods and not in industries where productivity per capita is reduced.

**"Properties of du Pont Rubber Chemicals."** E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Report No. 200. May 25, 1937. 164 pages. This indexed report describes the rubber chemicals produced by the du Pont organization. Under each chemical is the chemical composition, physical properties, compounding characteristics, uses, and patent numbers. Several of the more important rubber chemicals are described as to their characteristics, including suggested formulae and the results of physical tests on the type of compounds. Scattered throughout the book are blank pages for memoranda. The report lists 24 accelerators, ten anti-oxidants, six miscellaneous and four special chemicals for use with latex.

**"1937 Goodrich Redbook."** A Catalog of Goodrich Products and Sales Helps for the Tire, Battery, and Accessory Dealer." Second Edition. The B. F. Goodrich Co., Akron, O. In 80 pages attractively colored and designed for ready reference this volume makes it possible also for any dealer, should he happen to be out of stock on any particular size or style of any Goodrich product, to use the catalog as a selling medium by showing the prospective customer just how the article appears and all the salient service details concerning it. Tires and tubes of all types take up 17 pages of the book, batteries and battery equipment seven pages, accessories 11 pages. Thirty-four pages are devoted to a listing of every advertising and sales promotional help which the company furnishes to its dealers, with illustrations.

**"List of Inspected Electrical Appliances."** Underwriters Laboratories, Inc., Chicago, Ill., May, 1937. This indexed list, covering 344 pages, is ar-



ranged alphabetically, both as to subjects and as to manufacturer's name and location of headquarters. The book is divided into two sections: (1) electrical appliances used in ordinary locations and (2) those used in hazardous locations. There is also a list of markings used for identifying the manufacturer. Included in the subjects are various kinds of rubber covered wires and cables. The first few pages are devoted to explanations of the various services such as inspection, label, and reexamination services.

**"News about Du Pont Rubber Chemicals."** A news letter of June 3, 1937. Included with this news letter were three reports: (1) "Inner Tube Compounding," du Pont Report No. 199, dated June 1, 1937. This 16-page report features the use of du Pont rubber chemicals for use in passenger, bus, and truck inner tubes. The suggested compounds are supported by summaries of the physical test data obtained in the du Pont laboratories.

(2) "Determination of Neoprene in Vulcanized Compositions." Report N-3 of two pages describes the procedure for determining the presence and percent of chlorine and the method of calculating by formula the amount of Neoprene in the rubber.

(3) "Neoprene Sponge." Report N-4, of one page, recommends Type E Neoprene in a type formula and discusses the compounding technique which is considered to be important.

This letter is part of a monthly service which was instituted in May by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for the purpose of acquainting the rubber industry with du Pont rubber chemicals.

**"Employee Contact through the Bulletin Board."** Policyholders Service Bureau of the Metropolitan Life Insurance Co., New York, N. Y. This 24-page report discusses the results of 70 questionnaires that had been sent to different industries. The smaller companies are more inclined to use personal contact instead of bulletin boards. Where there are a great number of employees, the bulletin board for disseminating information has been found to be very valuable. The booklet includes many comments on such questions as: Who is responsible for the bulletin board and its construction; where the board should be located; what should be displayed on it; and the measure of effectiveness of the board. Two graphic figures show what information appears on the bulletin boards of 31 industrial companies and eight commercial institutions. On the former safety notices predominate, with instructions and group insurance notice next; while on the latter instructions take most of the space and recreational or accident prevention are second in importance. At the end of the report is a general summary of the survey data.

**"Morisons' Monthly Review."** No. 217. April-May, 1937, 56 pages. H.

Morison & Co. In this English publication 20 pages are devoted to rubber. In connection with the comments regarding the various commodity markets the influence of the National Defence Contribution is discussed—in most instances showing the unreasonableness of many of the taxes. Five pages are devoted to a study of how Dh N.D.C. is liable to have a bad effect on the crude and manufactured rubber markets. There are several tables showing figures related to crude rubber production, consumption, and exports.

**"Oil Power."** Vol. XII, No. 3, March, 1937. Socony Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y. This sixteen-page "Magazine of Industrial Romances" contains two articles. "Milk from a Tree" is a six-page illustrated story of crude rubber and the discovery of vulcanization. "Safety Fuse" is a five-page story of the invention of the safety fuse for blasting around 1830 by William Bickford, a leather merchant in Tuckermill, Cornwall, England. This safety fuse was introduced to America in 1836 by the predecessor company of the present Ensign-Bickford Co.

**"Chemical Industries. Chemical Buyers' Guide Book Section."** Part II. June, 1937, 374 pages. This magazine is Part II of a double issue of *Chemical Industries* for June. It contains three parts: Part I, 8 pages on white paper, shows the range of quotations of the chemicals from 1932 to 1936; Part II, 24 pages on yellow paper, lists the suppliers according to states and in many instances is subdivided into the larger cities; Part III, 335 pages on white paper, is an alphabetical list of commercial chemicals with their formulae, physical and chemical properties, industrial specifications, uses, containers, tariff, etc., with a buyer's guide of suppliers.

**"American Seamless Flexible Metal Tubing."** Bulletin SS-3. The American Brass Co., American Metal Hose Branch, Waterbury, Conn. This 16-page booklet describes a new flexible tubing made with a special high tensile bronze, furnished also in other metals if necessary. Because of the 100% tightness it is especially adaptable for conveying volatile liquids or gases, and because of the high degree of flexibility it is particularly suitable for rubber molding presses as well as many other applications where tubing must withstand repeated flexing. There are many pictures showing the tube construction and several applications as well as illustrating the different fittings available.

**"Earth-Moving Tires."** The B. F. Goodrich Co., Akron, O. This eight-page circular outlines the growing importance of the earth moving equipment field and how the use of pneumatic tires allows greater speed, lower maintenance costs, and longer life of the vehicle itself, owing to greater cushioning. It also describes construction features of Goodrich super-traction

tires range in size from the 6.0020 six-ply. Complete tables show the sizes, number of plies, rims, load per tire, and recommended inflation pressure of each tire made for this type of equipment. These tires range in size from the 6.00-20 six-ply with a carrying capacity of 1,400 pounds to the 18.00-24 size made with 20 plies and a carrying capacity of 16,000 pounds, or eight tons for each tire.

## BOOK REVIEWS

**"Chemistry and Technology of Rubber."** Carroll C. Davis and John T. Blake. Reinhold Publishing Corp., New York, N. Y. Cloth, 890 pages. Illustrated. Price \$15.

This book is an American Chemical Society monograph (No. 74). Each chapter is written by an expert who is an authority in his particular phase of rubber technology. While some contributions were made by European and Canadian technologists, the book is essentially a treatise by American experts.

The production of crude rubber and liquid latex is treated briefly. Emphasis is placed on the latest technical developments in the manufacturing industry and in research and laboratory technique. Under the latter vulcanization, accelerators, and antioxidants are discussed in considerable detail. The theoretical aspects of rubber technology are adequately balanced with comprehensive discussion of up-to-date manufacturing and testing practices. Specialized subjects such as rubber reclaiming, gutta percha and balata, synthetic and substitute rubbers, and rubber derivatives are well covered. There are two chapters on physical and chemical testing of rubber and rubber products. The final chapter is devoted to a concise discussion of the literature of rubber chemistry. At the end of each chapter is an extensive bibliography. The index is very complete with excellent cross-references.

**"Man in a Chemical World."** A. Cressy Morrison. 9¼ by 6½ inches. 292 pages. Published by Chas. Scribner's Sons. Price \$3.

This book was written for the purpose of acquainting the layman with the role that chemistry performs in his daily life. It is written in romantic, non-technical language.

The author divides the book into various fields, starting out with chemistry in nature, then passing to man's use of this natural chemistry. In the classifications of health, food, transportation, communications, home, industry, and security, he shows how chemistry has been a very important factor in attaining our present high state of social and industrial development. Each phase of influence is traced from the beginning to the present time in such an interesting manner that the non-

(Continued on page 72)



## New Machines and Appliances



Bristol Pyrometer

### Portable Pyrometer

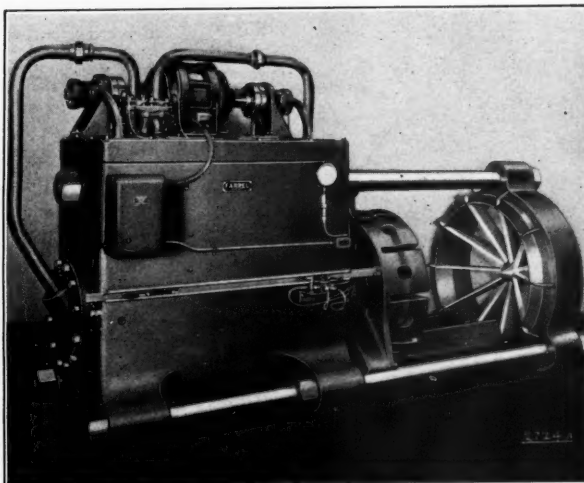
THE new millivoltmeter-type portable indicating pyrometer is especially suitable for measuring temperatures of mill and calender rolls and mold equipment up to 500° F. The instrument can be used with standard thermocouples and extension leads or with the surface contact thermocouple ribbons used for measuring roll surface temperatures. The use of a cobalt magnet increases the sensitivity and widens the scale without sacrificing accuracy. The movement is double-pivoted and completely shielded from stray fields. The cover is moisture- and dust-proof. The instrument is available in single and double ranges. Bristol Co., Waterbury, Conn.

### Three-Rod Rubber Cutter

THIS new bale cutter has only three tie rods instead of the former four. With only one tie rod at the top, the rails on which the bales are placed for cutting are more accessible, and the bales can be loaded more easily from above or from the side.

#### Cycle Operation

Two hydraulic pumps driven by the same motor provide rapid approach to the work, reduced cutting speed at high pressure, and a rapid return of the crosshead to the starting position. The motor and pumps are set into motion by depressing the "start" button. The moving crosshead, which pushes the rubber bale into the knives, is started on its stroke by manual operation of a small pilot valve mounted in a convenient position on the operating side of the machine.



Farrel Rubber Bale Cutter

At the end of the forward stroke the ram is automatically reversed by an adjustable trip mechanism, and the crosshead and ram return to the original start position at high speed. At the end of the reverse stroke a limit switch stops the motor and pumps unless the pilot valve is moved to the forward stroke position. The operation of the machine can be continuous if proper handling facilities are available. By means of the pilot valve the direction of the motion of the ram may be reversed instantly at any point of the stroke. The operating cycle is entirely automatic and during this time the operator can be preparing the next bale for the machine.

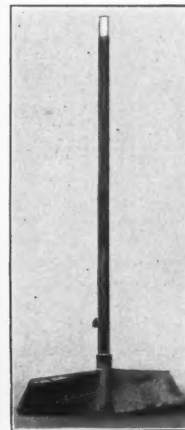
#### Oil Pressure

During the first part of the forward stroke, before the cutting begins, both pumps deliver their full volume of oil to the cylinder at a pressure below 200 pounds per square inch. When the pressure builds up to 200 pounds a by-pass valve discharges the entire delivery of one pump directly to the tank; while the other pump continues to furnish pressure to the cylinder up to a maximum of 600 pounds per square inch, which is the recommended setting for the relief valve in the line. When reversing the combined delivery of both pumps discharge to the opposite end of the cylinder as long as the pressure remains below 200 pounds per square inch.

#### Design

The hydraulic cylinder and the tank containing the oil supply are made in one casting which is fitted with a heavy cast cover to form a baseplate on which

the power plant is mounted. This bale cutter follows the modern trend in industrial design, which combines the pleasing appearance of clean, straight lines with structural improvements that make the machine more convenient to operate and provide greater strength and dependability. Farrel-Birmingham Co., Inc., Ansonia, Conn.

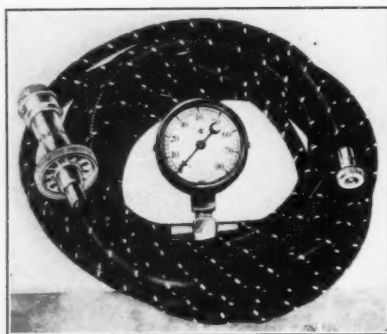
Acid  
Agitating  
Paddle

### Acid Resisting Alloy

HASTELLOY B, a new alloy developed jointly by Union Carbide & Carbon Corp. and the Haynes Stellite Co. is especially resistant to corrosion under extremely severe conditions, such as are encountered in the handling of various acids at temperatures up to and including the boiling point. This new alloy differs from Hastelloy A in that it has a lower iron and a higher molybdenum content. Notwithstanding its hardness and great strength, Hastelloy B can be rolled or forged and is available in many different forms. Some of the more important applications for Hastelloy B are agitator units, heating and cooling coils, pump parts, valves, and pipe fittings.

### Spark Plug Pump

A SPARK plug pump, so called because it screws into the plug opening in the motor, has been developed to inflate tires, air mattresses, rubber boats, and air pressure tanks, to spray trees, paint, etc. Model No. 8888 spark plug pump has a wide range of possible uses. It encourages the immediate correction of under-inflation instead of risking damage to a tire by running it soft to the nearest service point.



Schrader Air Pump

Any gasoline motor of two or more cylinders will operate the pump. Construction of the unit assures quickest possible inflation up to 60 pounds of air, but does not admit gas vapor. The opposite end of the pump hose is fitted with a tire valve connection. Tires can then be quickly inflated by running the motor at idling speed.

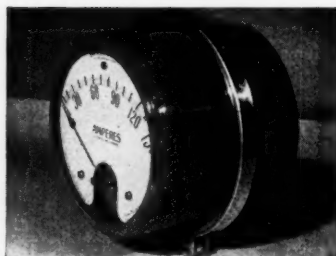
A standard set consists of 16-foot length of hose, pump with one adapter and pressure indicator. The device is also available with 12-foot lengths of hose and without the indicator. Five adapters that fit the pump to all standard spark plug openings may be purchased separately or as a set for service work. Additional 12-foot lengths of hose may be purchased if desired. A. Schrader's Sons, 470 Vanderbilt Ave., Brooklyn, N. Y.

### Tire Repair Mold

A SECTIONAL repair mold, Type JS, has been developed to handle 43 popular tire sizes from 4.50-21 to 7.50-17 including bus, truck, and heavy-duty as well as passenger tires. The size of the mold is varied by the use of side plates, mold fillers, and filler spacers. The bead plate curvatures are controlled by an assortment of bead plates with five different radii. The heat source may be 110 or 220 volt A.C. or D.C. or steam pressure. The mold, which weighs approximately 400 pounds, occupies floor space 14 by 26 inches and is 20 inches high. James Q. Heintz & Co.

### Detachable Plug-in Meters

A NEW type of detachable, plug-in, indicating instrument which does not require panel mounting has been developed for studying the consumption and performance characteristics of circuits feeding electrical loads. The main advantage of this new type is the ease of connecting and disconnecting the instrument where it is to be used only occasionally. Thus one set of instruments can be used for determining the performances of various circuits separately without the necessity of an elaborate hookup. By means of a socket in the line the instruments can be plugged in whenever a reading is desired. All internal connections are per-



Plug-in Socket and Instrument

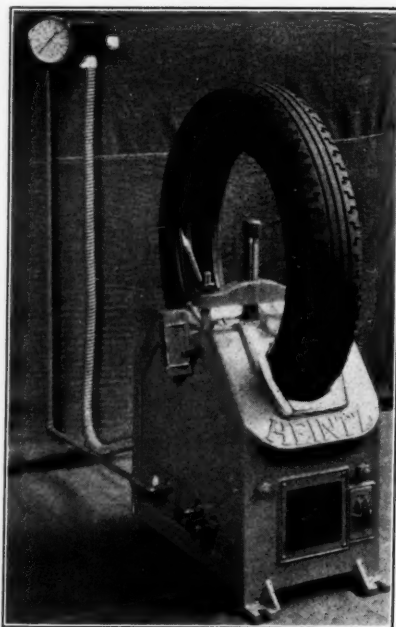
manently made at the factory. The various instruments fit the socket and cover a wide range of readings. Westinghouse Mfg. Co.

### Treadle-Operated Push-Button

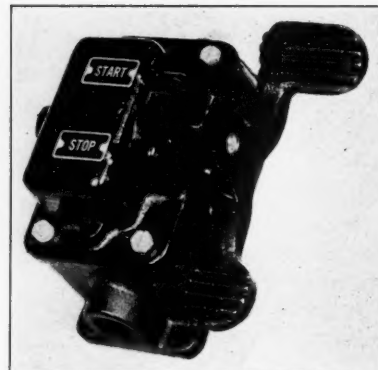
FOR installations where an operator must have both hands free while starting or stopping his machine a new treadle-operated, watertight push-button station (Type CR2940-2A18) has been developed. The station is avail-



Kwick-Kut Groover



Heintz Tire Mold



Electrical Start-Stop Station

able either with a single-action or a double-action treadle. The enclosing parts of the station, case and cover, are made of cast-iron with a cast-iron foot-pedal built into the cover. This pedal, which operates a standard heavy-duty-type push-button unit mounted inside the case, is provided with stops to limit its travel in either direction to prevent endangering the electrical parts of the device.

To eliminate moisture a packing gland is fitted on the treadle shaft where the latter enters the case. This shaft is also provided with a spring which guarantees automatic return of the pedal to the neutral position, thus preventing the push-button unit from remaining depressed because of the weight of the pedal or friction in the packing gland. The blocks, or barriers in the push-button unit, are made of molded material and are sprayed with a Glyptal paint to prevent their being affected by water.

The case is arranged for conduit connections on either end and is so built that it can be mounted directly on the floor. The conduit connections will accommodate standard 3/4-inch pipe. General Electric Co.

### Tire Grooving Tool

THIS series of tire grooving tools is electrically heated. This new line, using up to 400 watts, can be used for bus, truck, and solid tires. The complete series ranges from 100 to 400 watts, and has three different types of cast aluminum grip-type handles and improved heat dissipators for keeping the handles cool regardless of the wattage used. Kwick-Kut Mfg. Co.

### Magnifying Glass

THE Bausch & Lomb microfilm reader is useful for reading single motion picture frame size prints or microfilm pictures. The reader magnifies 7 1/2 to 8 times, which makes the film appear like a standard page at a normal reading distance. This device is made with a black bakelite body and film frame and has a focusing sleeve for individual adjustment. Bausch & Lomb Optical Co.

## EASTERN AND SOUTHERN

ACCORDING to government economists a minor slump in industrial activity will take place during the next few months, but the longer-range outlook is relatively favorable. Factors contributing to this belief are the return of buying to a current needs basis; unsettling influences of strikes; the small volume of new capital financing; and relatively little building activity. On the other hand the outlook for heavy crops this season is very promising. Railroads also are reported excellent prospective customers of heavy industries this year and for several years to come because of increased traffic volume, gradual deterioration of equipment, and increased earnings. Many other lines of business are in a similar position. Another interesting point is that great numbers of workers who in former years received no vacations are getting them this year and with pay in most instances.

**Purchasing Agents Meet**

The 1937 annual meeting of the Purchasing Agents' Association of New York was held June 15 at the Builders' Exchange Club, 2 Park Ave., New York, N. Y. John K. Conant, president of the association for 1936-37, conducted the meeting, his last for the year.

During the past year those from the rubber and allied industries who addressed the association were Dr. James K. Hunt, research chemist, E. I. du Pont de Nemours & Co., Inc., on "Chemistry in Industry"; and Cyrus S. Ching, director of public and industrial relations, United States Rubber Products, Inc., on the subject "Employer and Employee Relations."

The net membership of the association at the beginning of the 1936-37 year was 282 and increased 12% so that it now stands at 315. Mr. Conant stated that the finances of the association were in their "usual state of soundness."

At this, the last meeting of the 1936-37 year, the members were addressed by Walter S. Landis, vice president of American Cyanamid Co., on "What's Behind the Price Trend." Mr. Landis is a graduate of metallurgical engineering from Lehigh University and in addition to other societies he is a member of the American Chemical Society. He has had wide contact with American and European business affairs.

Benedict Van Voorhis, plastics department, E. I. du Pont de Nemours & Co., Inc., was elected president for 1937-38.

**Vulcanized Rubber Co.,** Morrisville, Pa., reports that business slackened up the past month. Employees of the company have organized a union and become affiliated with the United Rubber Workers of America. The union has leased quarters opposite the plant.



Kaiden-Keystone Photos

Wm. B. Wiegand

**Wiegand Addresses Paris Congress**

Newly discovered properties of colloidal carbon critically affecting its application in rubber, paints, lacquers and inks were described by William B. Wiegand, director of carbon research of the Columbian Carbon Co., 41 E. 42nd St., New York, N. Y., before the Congress International de Caoutchouc, world organization of rubber technologists, meeting in Paris June 28 to 30.

The ionic and hydrolytic adsorptive power of colloidal carbon, Mr. Wiegand has found, affects its chemical character as to acidity or alkalinity (pH value), and this may now be exactly evaluated. This property is of special significance as affecting the character of mixtures of colloidal carbon with other materials.

The principal value of colloidal carbon, according to Mr. Wiegand, lies in its extraordinary development of surface which imparts strength and wear resistance to mixtures. The particles in each pound of colloidal carbon have a combined surface area of about 14 acres, equivalent to 3½ city blocks in midtown Manhattan.

Columbian Carbon's new research laboratory, devoted solely to the study of colloidal carbon, its manufacture, and its applications, will be formally opened in the early fall. This research laboratory will contain an operating carbon production unit. Columbian Carbon Co. also maintains research organizations at its Frederick H. Levey Co. Division, at its Magnetic Pigment Division, and at the Mellon Institute of Industrial Research, Pittsburgh.

**Rubber Specialties Co., Inc.,** Conshohocken, Pa., has under construction at Plymouth Meeting, Pa., a new plant where the firm will continue produc-

tion of miscellaneous rubber sundries, biological and mechanical products, and golf balls. The factory will have approximately 10,000 square feet of floor space and will employ about 100 workers.

**Continental Carbon Co.,** 295 Madison Ave., New York, N. Y., which recently entered the field with a new 160-acre plant at Sunray, Tex., placed an order for specially constructed tank cars to transport Continental's Dustless Carbon Black. These cars are loaded through the top and have special unloading hoppers through which the black is released to conveyers at the customer's plant. Sealed openings at the sides provide easy access for sampling. Large users of carbon black, such as the big rubber companies, have found this method of transportation not only more convenient, but cleaner and more economical.

**Du Pont Notes**

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., on June 18 held a common stockholders' meeting at which they adopted by a vote of more than 75% of the stock an amendment to the company's certificate of incorporation authorizing the creation of 500,000 shares of \$4.50 cumulative preferred stock without par value. This stock will be junior to the present debenture stock. The board of directors met June 28 to arrange details.

The company has announced that, based on reports from its various plants and office buildings, its safety record in major injuries for 1936 is the lowest in its history. The number of employees in 1936 was 53,000, about 15% more than at the end of 1935. The total number of tabulatable major injuries, the company stated was 170. The frequency rate was 1.9 major injuries per 1,000,000 hours of work. The fatality rate per 1,000,000 hours worked was 0.067. The severity rate was 0.83 days lost because of major injuries per 1,000 hours. These percentages establish all-time low records in the company's history.

Harry A. Clark, of the du Pont organization, was elected president of the Export Managers Club of New York, Inc., at the annual meeting June 8. After the business meeting of the club E. H. Himrod, of the du Pont company, described Venezuela's extensive agricultural and resettlement program, presenting a good market for all types of construction and farming equipment.

John H. McQuade, identified with the metropolitan New York sales of Grasselli chemicals since 1922, has been appointed manager of the Rensselaer, N. Y., branch office of du Pont's Grasselli chemicals department, succeeding Joseph Krackler, recently made man-



ager of the Boston office, replacing Joseph H. Mulligan, on leave of absence. T. S. Nichols has been named assistant manager of the metropolitan New York branch office, under the supervision of Edward J. Maguire. T. K. Handy has been transferred to New York office sales, after having covered the New Jersey territory for several years. James N. Smith has been sent from the Philadelphia to the New York office to do field work.

Sales executives of the Grasselli department honored an eighty-year-old associate at a dinner in the Hotel du Pont, Wilmington, at the conclusion of a two-day conference. C. B. Lyon, of St. Paul, Minn., who started with the old Grasselli Chemical Co. fifty years ago, was congratulated by his fellow executives on his long service and his birthday, May 15. Fifty-four executives from 27 cities east of the Mississippi attended the conference, which was arranged by H. B. Mansfield, director of sales, and E. A. Orem, sales manager, Wilmington.

### Sales Manager

Carl (Cabby) A. Bartle, sales manager for du Pont's Rubber Chemical Division, comes originally from Philadelphia, where he was born November 13, 1894. After Northeast Manual Training High School he attended Pennsylvania State College and graduated in 1916 with a B.S. degree in electrochemical engineering.

Except for two years (1916-1918) as research engineer for the Aluminum Co. of America, Niagara Falls, N. Y., and four years (1919-1923) as chemical production supervisor for the National Aniline & Chemical Co., Marcus Hook, Pa., Mr. Bartle has been associated with E. I. du Pont de Nemours & Co., Inc., since graduation. In 1918-1919 he was chemical supervisor at Gibbstown, N. Y. In 1923 he started in rubber chemical sales, became assistant sales manager in 1929 and sales manager in 1932.



Blank & Steller

Carl A. Bartle

Mr. Bartle is a member of the American Chemical Society and takes an active interest in the Rubber Division, being vice chairman of the New York Group. He belongs also to Phi Kappa Phi. As hobbies he lists fishing, hunting, bowling, and golf.

Mr. Bartle is a bachelor and lives at 1703 Broom St., Wilmington, Del.

**Dunlop Tire & Rubber Co.**, River Rd., Buffalo, N. Y., in its business for 1936 showed much improvement although the profit and loss statement was unsatisfactory. According to reports the firm has contracts for a substantial portion of tires for Sears, Roebuck & Co., Chicago, Ill., mail order house, and about 1,500 casings are being produced daily by Dunlop as a result. The Buffalo concern is running on the highest production schedule in recent years, and employment has reached the 1,600 mark.

**Pennsylvania Rubber Co.**, Jeannette, Pa., has appointed L. J. Waldron as general sales manager succeeding A. Koehler, resigned. Mr. Waldron, a Dartmouth University graduate, joined the Pennsylvania company in 1915 as a salesman. Shortly afterward he became manager of the Boston branch. He came to the factory in 1924 as sales manager and five years later was made eastern district sales manager, which position he held up to the time of his new appointment on June 16.

### Research Expert

Among those engaged in rubber research and development for the past 28 years is F. S. Malm, of Bell Telephone Laboratories, Inc., New York, N. Y. He was born in Lemont, Ill., June 14, 1885, and attended the Armour Institute of Technology and Lewis Institute, Chicago, Ill., where he majored in chemical engineering. In 1906, Frank Malm entered the students' training course of the Western Electric Co.'s Hawthorne Works, after which he received an assignment pertaining to the installation of telephone switchboards and later in switchboard cable design. In 1908 he became a member of the Manufacturing Methods Organization as rubber engineer, where he later took charge of chemical engineering and development work on hard rubber, soft rubber, and thermoplastics. After serving 12 years in this capacity he transferred to the Submarine Cable Development Branch and in 1929, because of his thorough knowledge and experience with rubber and allied materials, he went to Europe on submarine cable projects. After three years abroad he returned to join the Chemical Department of the Bell Telephone Laboratories where he is now engaged in research on submarine insulations and special studies relating to rubber and allied substances.

Mr. Malm is a member of the American Chemical Society, the Institute of the Rubber Industry, London, England,



Blank & Steller

F. S. Malm

and of the Executive Committee, New York Group, Rubber Division, American Chemical Society. He has contributed to the scientific literature and has been granted a number of patents relating to the rubber industry.

Mr. Malm is interested in photography and gardening although most of his spare time is devoted to rubber problems.

In 1922 Mr. Malm married Emma M. Behrens, of Chicago, and has two sons, Donald being 5 and Frank 11 years old. The family resides in Milburn, N. J.

### Florida Rubber Trees

The *Hevea* and *Castilla* rubber tree growing experiments being carried on in the waste lands of Florida by the United States Department of Agriculture show that the first generation of trees has been able to withstand temperatures as low as 30° F. It is expected that the second generation will be still better adapted. While Florida rubber growing may not be competitive under the present crude rubber prices, it may be practicable if restrictions force the price of rubber considerably higher or if an emergency should interfere with rubber importation. The methods used for tapping the *Hevea* tree cannot be used on the *Castilla* trees. The latex tubes in the former are connected; whereas the tubes in the latter are not; hence the native method of making many cuts is used on the *Castilla* tree, but this soon kills the tree. The department is investigating methods of extracting the rubber from the bark and leaving the wood available for pulp and other by-products.

**United States Rubber Products, Inc.**, 1790 Broadway, New York, N. Y., has announced that C. W. Gilmer, manager, mechanical sales, Seattle, Wash., branch, has been transferred to the New York office as belting sales engineer, operating under T. A. Bennet, manager, belting sales. L. F. Koepp,

(Continued on page 72)



## NEW ENGLAND

**R**EGARDING New England business, the outstanding feature is the lack of forward buying, although miscellaneous factory operations have declined only very slightly. Total industrial output is estimated at less than 5% under the year's peak. The shoe industry is more active.

Payroll withdrawals from Rhode Island banks during May totaled \$11,750,893, an increase of 35% as compared with May, 1936, and 1.4% over April, 1937. The rubber industry, with a total of \$280,109, was 6.3% less than during April, but 18.4% above May, 1936.

### Brockton Tool Celebrates 25th Year

This year the Brockton Tool Co., Brockton, Mass., is celebrating its twenty-fifth anniversary as manufacturer of quality molds. The company was founded in August, 1912, by Levi Holmes and John Sandberg for the purpose of manufacturing mold equipment for rubber soles and heels. At that time the rubber heel and sole industry was in its infancy.

In 1928 the firm experienced a loss in the passing of Mr. Sandberg, who was drowned in the Moosehead Lake tragedy which took the lives of several prominent Brocktonians. In the same year the Brockton Tool Co. was incorporated with Levi Holmes as president and treasurer. In November, 1929, Herbert H. Wydom, for several years mold engineer at the Hood Rubber Co., Watertown, Mass., became associated with the organization. At present the officers of the company are: Herbert H. Wydom, president; Gilbert W. Holmes, secretary; and Levi Holmes, treasurer.

During this interval the company has been instrumental in developing many improvements on molds as well as helpful in designing heels and working out rubber heel problems. The company has broadened its field to include the manufacture of molds for mechanical and other rubber products, and today enjoys a growing business.

Among its customers are included rubber manufacturing concerns of Central and South America and Canada as well as the United States.

The Brockton Tool Co. has maintained a policy of manufacturing quality mold equipment and enjoys an enviable reputation in its field.

**George W. Rogers**, representing the Electrical & Radio Workers' Union of America, a C.I.O. affiliate, has withdrawn charges of violating the Wagner Labor Relations Act submitted recently to the National Labor Relations Board against the Collyer Insulated Wire Co., of Pawtucket, R. I.



R. H. B. Fuller

### Silver Jubilee

Last month marked the completion of 25 years' service as sales manager of The Stamford Rubber Supply Co., Stamford, Conn., for Royal H. B. Fuller. Prior to his present position Mr. Fuller spent several years in "Specialty Selling" for the Dodge Metal Cap Co. and Charles T. Howe & Co., covering all of the United States and Canada.

He was born in Pelham Manor, N. Y., in June, 1882. His hobbies are tennis, baseball, and stamp collecting, and he also belongs to the Stamford Chamber of Commerce.

Mr. Fuller is married and lives at 171 Stamford Ave., Shippan Point, Stamford. His son, Warren Brewster, is southern sales representative for the Knox Hat Co., and his daughter, Marion Valleau, attends Sweet Briar College.

**Jenkins Bros.**, Bridgeport, Conn., has appointed William J. Frisby to direct the sales of the Jenkins Capless Tire



Wm. J. Frisby

Valve. Mr. Frisby for the past eighteen years has been associated with The B. F. Goodrich Co., Akron, O. His activities have included almost every branch of the sales department, and he is well known to automobile and tire manufacturers as well as the large distributors.

**The Committee on Fire Department of Woonsocket, R. I.**, after considering bids from six outside concerns for fire hose, has awarded the contract to the Eureka Fire Hose Co. after Chief Augustin J. Cote told the committee that this company's hose had proved satisfactory in the past.

### Godfrey L. Cabot, Inc., Increases Production

**A**S a result of a survey in 1935 which indicated that the then existing facilities for carbon black production would not continue to meet the rapidly growing demand, Godfrey L. Cabot, Inc., Boston, Mass., started a program of raw material and plant expansion to provide a capacity increase of approximately 3,250,000 pounds per month.

An entirely new plant at Wickett, Tex., is now in production with a capacity of 1,200,000 pounds per month, and another new plant, at Kermit, Tex., with a monthly capacity of 1,100,000 pounds, is almost ready for productive operation. Additional units have increased monthly production by 450,000 pounds at the Armstrong plant in the northern Panhandle and by 500,000 pounds at the Bowers plant, said to be the largest carbon black plant in the world. Besides this net increase in capacity of 3,250,000 pounds per month, which will soon be reached, the company states that it is prepared to continue its policy of expansion in accordance with the demand.

Godfrey L. Cabot, Inc., believes that operating conditions at their plants are well stabilized and announces the extension of present price schedules throughout the remainder of this year.

### Additional Gifts by Dr. Cabot

Godfrey L. Cabot, president of the company, who is also widely known as a philanthropist and aviation enthusiast, last month gave to Harvard University the sum of \$615,773 for a long-range investigation of methods of increasing the rate of growth of plants and especially trees and thus increase the future largest source of fuel and manufacturing materials available to man. This donation, the first of its kind in its field, is to be called the "Maria Moore Cabot Foundation for Botanical Research" in honor of Dr. Cabot's deceased wife.

This announcement came the day after one stating Dr. Cabot had given

\$120,000 to Norwich University for construction of a wind tunnel and other aviation experiments.

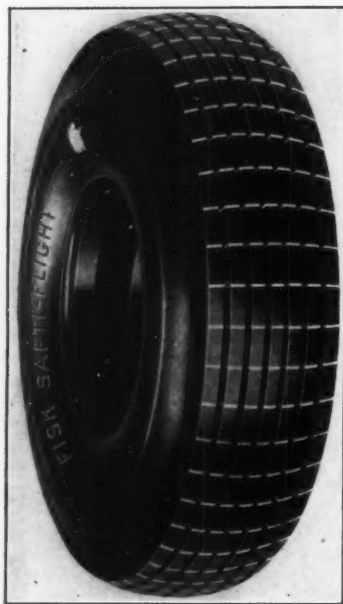
The philanthropist, accompanied by his granddaughter, on June 11 sailed on his semi-annual trip to Europe where he will attend the conference of the Federation Aeronautique Internationale, of which he is vice president. He will return about July 4.

**Federal Products Corp.**, manufacturer of precision measuring instruments, 1144 Eddy St., Providence, R. I., according to I. A. Hunt, sales and advertising manager, has found it necessary in order to take care of its customers to move its Detroit, Mich., office and service department to larger quarters at 7310 Woodward Ave. Another representative, Henry I. Bouchard, has been added to the office to supplement the work of C. G. Gilbert. Mr. Bouchard will devote his time to the outlying territory around Detroit. The firm has also announced that R. T. Palmer, its New England agent, has opened an office at 241 Powers Bldg., Rochester, N. Y., with Robert B. Hawkins in charge. Mr. Hawkins has worked with Mr. Palmer throughout New England and New York State for a long time and is now confining his efforts to upper New York.

**Hodgman Rubber Co.**, manufacturer of rubberized sporting goods and clothing, Framingham, Mass., has appointed "Bill" Logan, P. O. Box 1161, Houston, Tex., its representative in the southwestern states.

### New Tire Tread

Announcement was recently made of a new seven-rib, high profile passenger car tire called Safti-Flight. It is claimed that the tread differs



Fisk Safti-Flight Tread

from any heretofore known in that while it looks like a continuous rib tire with white cross-markings, it is actually divided into several hundred independently acting, design deep rubber cleats, each one insulated from its neighbors by a ribbon of specially compounded soft white gum. The stopping efficiency of this new tire, as shown in tests, is said to be remarkable. It is extremely flexible and easy-riding, and the continuous rib effect reduces rolling resistance and eliminates "tire hum." The tire will be made with both white and black sidewalls. The Fisk Rubber Corp.

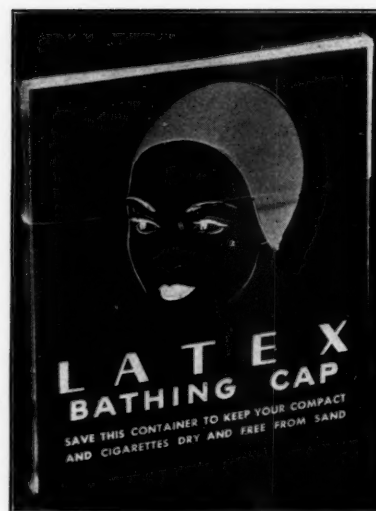
**John Lunn**, executive assistant to Bradley Dewey, president of the Dewey & Almy Chemical Co., Cambridge, Mass., recently returned from a four-month trip to Europe where he visited industrial plants in England, France, Germany, Austria, Hungary, Czechoslovakia, Belgium, Holland, and the Scandinavian countries, saw the factories in operation, and discussed operating and marketing problems with superintendents and managers. The whole trend of Europe, Mr. Lunn points out, is for each country to become self-sufficient and manufacture within its own borders the products which it needs. This policy means that, in the smaller countries especially, large-scale production is confronted with a lack of markets resulting from falling exports; consequently manufacturers are turning away from the American ideal of specialization and are manufacturing in one plant a wide range of articles to meet the needs of their own country for articles no longer imported. Many plants work on small capital, hampered by the lack of automatic machinery, which they cannot buy because of the limitations of foreign exchange. These plants have designed and built their own machines to meet conditions imposed by economic forces.

**Ernest I. Kilcup**, managing executive of the Davol Rubber Co., Providence, R. I., received the honorary degree of Doctor of Science from the Rhode Island College of Pharmacy June 9. The award was made in recognition of Mr. Kilcup's services as an executive and honorary officer of the National Association of Credit Men as well as his services in the pharmaceutical field.

**The Ninigret Mill**, Canal St., Pawtucket, R. I., formerly owned and operated by the Fisk Rubber Co., Chicopee Falls, Mass., has been sold for manufacturing purposes.

**The D. R. & D. Tire Co.** has been awarded a contract to furnish 1,050 feet of fire hose for the Newport, R. I., fire department.

**The Seamless Rubber Co.**, New Haven, Conn., won an award and three honorable mentions in the Irwin D. Wolf Awards Competition for its latex bathing caps package designed by An-



### Prize Winning Package

derson, Davis & Platte, Inc. The transparent envelope is of Kodapak, and all advertising is printed on two inserts which may be removed, leaving a handy container for cigarettes, etc., at beach or pool. The package was chosen for first honors as "The most effective package insert." It was also given honorable mention as "The most effective package employing a secondary use;" "The most effective package for a product not previously packaged;" and as "The most effective use of merchandising ingenuity."

### Synthetic Insulating Compound

A new synthetic insulating compound which will not support combustion, has recently been introduced commercially under the name Flamenol. It contains no rubber, but is reported to be similar in its characteristics in that it can be put into solution for coating or impregnating, can be compounded and calendered or extruded in much the same manner as rubber. It is resistant to moisture, acids, alkalis, and oils, has a smooth, non-adhesive surface, and can be supplied in a variety of colors.

**The Dewey & Almy Chemical Co. of Canada, Ltd.**, is building a new factory at Ville LaSalle, on the outskirts of Montreal, which must be ready by mid-September. Cost of the new plant is estimated at between \$55,000 and \$60,000. The factory and office will contain 18,000 square feet of floor space, and the office is to be air-conditioned. The manufacturing operation now being carried on at the company's plant in Farnham, Quebec, will be moved to this new and larger factory and the one at Farnham, with its 8,000 feet of floor space and adjacent superintendent's house, will be closed.

## OHIO

**L**ABOR disputes, especially in the steel industry are the dominating note in the industrial picture. In rubber manufacturing, the tire industry is believed to be operating at higher levels than warranted by current sales, and already large inventories are mounting.

## Goodyear News

*The Wingfoot Clan*, a factory newspaper published by the Goodyear Tire & Rubber Co., at Akron, celebrated its twenty-fifth anniversary on June 1. It is believed to be one of the oldest publications of its kind in the country. Each Goodyear plant outside of Akron has its own *Wingfoot Clan*, one being printed in Spanish and one in French. The paper, confined to news of the industry and the company, is circulated among factory employees.

Many changes have taken place during the past 25 years. In 1912 plantations of the Far East furnished less than 20% of the world's rubber, but today they supply more than 95% even though world consumption has increased nearly 1,000%.

Rubber sold for \$1.38 per pound in 1912, following the Brazilian pool of 1910 which had forced the prices up to \$3 a pound. Since that time rubber has sold as low as 3¢ a pound.

Tires, including solid types, were built in only 25 sizes in 1912, but today cover several hundred sizes and types.

Goodyear's aeronautics department was just getting under way in 1912; spreading machinery having been brought over from Scotland two years before. The first of the famous Goodyear racing balloons competed in the national races at Kansas City that year and in the year following won the James Gordon Bennett Cup Race out of Paris. The airship field at Wingfoot Lake was laid out in 1914, a nucleus of the organization which was to build more than 1,000 observation balloons and 100 blimps for war service.

*The Wingfoot Clan* was started by President P. W. Litchfield, then superintendent, who stated its purpose in the first issue as being to continue contact and understanding between management and men, which was being made more difficult by the growth of the industry.

## New Tire

Believed the first major manufacturer in the United States to meet the challenge of rising costs, Goodyear last month placed on the market a new top-quality safety tire at no advance in price. Construction features making this new tire, known as R-1, outstanding in its class were listed as wider, flatter tread; 12% more rubber in the tread; higher, broader shoulders; center traction; Supertwist cord carcass con-



Goodyear's R-1 Tire

struction; and handsome, streamlined sidewall.

## Among the Personnel

Paul Faulkner, of the Goodyear garage, has probably had more tires blow out under him at high speed than any other man in the world; and he's never had a scratch, never had a car turn over, never even dented a fender. Throughout the development of Goodyear's LifeGuard tube Mr. Faulkner worked with the development department men; and after the tube was perfected he had to demonstrate it.

Now as a part of his regular job, he blows out six or eight a day. He attaches a dynamite cap to the sidewall and sets them off at 70 miles an hour; or he runs over a plank bristling with iron spikes. With LifeGuards, Mr. Faulkner blows a tire and takes his hands off the steering wheel. The LifeGuard proved a novel solution. The tires might still blow out; but if they did, nothing would happen. A tube inside a tube was the idea, and the inner tube would still have enough air in it after a blow out to carry the car smoothly along till the driver brought it to a leisurely stop.

Buckshot fired broadside into the tire bounced harmlessly off the inner tube. Great knives jabbed into the tire might split the casing and the outer tube, but the inner one merely gave way and remained unharmed. The demonstration tires ripped open by a knife are beyond repair, but on the dynamited tires, the test man simply puts in a repair section and goes ahead, getting four or five blow-outs out of a single tire.

Mr. Faulkner has been a test driver for Goodyear for 14 years. He was

born at Toronto, on the Ohio River.

A. P. Bethel, Goodyear's St. Louis district manager, has announced the appointment of Raymond E. Tait as assistant district manager. Mr. Tait has been with Goodyear in various capacities for more than 20 years, most recently in charge of accessory and tube sales for the south central division, with headquarters in Akron.

The demand for tractor and farm-impliment pneumatic tires is expected to amount to 800,000 units this year, with a value of \$15,000,000, Mr. Litchfield said recently. In 1933 sales were only 20,000 units, value \$600,000.

The organization's Twenty-Year Club recently elected the following officers: John Icenhower, president; R. C. Griffith, vice president; and W. F. Kreher, secretary-treasurer. The club held its annual outing June 19 at Waterworks Park, Cuyahoga Falls.

More than 600 Goodyear and Goodrich Foremen's clubs members turned out for the tournament at Mayfair Country Club June 12, and 484 competed in the big golf event. Goodyear won by the narrow margin of a fraction of a stroke. The Goodrich Foremen's Club will be host to the Goodyear Foremen's Club at a similar tournament in August.

*Forbes Magazine* announces a series of photographs "immortalizing the American worker" at his job to be featured on the cover of each issue. The workman on the June 1 cover is Dan K. Huff, veteran of 21 years' service in Goodyear's Akron plant. The photograph illustrates an operation in building a truck tire and shows the worker stretching the flipper strip which covers the bead holding the tire-shaped core prior to laying sidewall and tread after which the tire will be sent to the pit room to be vulcanized.

## Goodrich Activities

S. B. Robertson, president of The B. F. Goodrich Co., Akron, on June 9 announced that a new mechanical rubber goods plant with a capacity of 500,000 pounds of rubber goods per month was completed at Cadillac, Mich., and scheduled to begin operations July 1. The new unit, formerly occupied by the Acme Motor Truck Co., was completely reconditioned for rubber manufacturing purposes. Of brick and steel construction, it contains 117,000 square feet of floor space. It will be operated almost exclusively for the manufacture of rubber products used in the automotive industry, as channeling for automobile windows, rubber body mountings, and various types of molded and extruded goods. Approximately 250 persons will be employed when the plant opens, with an estimated total of 500 employes when capacity production is reached.



Completion of the Cadillac unit marks the beginning of operations at the second new plant put in production by Goodrich this year. At the recent annual meeting stockholders were told that a new tire factory having 175,000 square feet of floor space and employing 450 persons had been completed at Oaks, Pa., at a cost of \$1,350,000 and was producing tires for Ford and Chevrolet. Capacity of the Oaks plant was said to be 5,000 units per day.

With the opening of the Cadillac factory Goodrich will be operating eleven rubber fabricating units and one textile unit. These plants consist of the main Goodrich and Miller plants at Akron; Pacific Goodrich plant at Los Angeles; Martha Mills plant at Silvertown, Ga. (textile plant); Watertown, Mass., plant; Oaks plant; Cadillac plant; besides a number of foreign interests including the plant of Canadian Goodrich at Kitchener, Ont.

The new plants at Cadillac and Oaks will supplement manufacturing facilities now available and will not involve curtailment of operations at any other plants, it was said.

More than 50 million rubber trees are required to produce 75,000 to 80,000 long tons of crude rubber used annually by the Goodrich company, according to a recent report of the company's crude rubber division to President Robertson. The average rubber-producing tree in the Far East is estimated to yield between three and four pounds of dry rubber yearly, and this figure was used in arriving at the total of trees necessary to keep Goodrich factories in operation for a 12 months' period. The average weight of rubber in a pneumatic tire, adjusted in accordance with the proportionate number of various sizes produced for passenger cars, buses, trucks, farm implements, tractors, and other vehicles, is about 16½ pounds so that the total annual output of four or five trees is necessary for each tire on present-day automotive equipment. It is estimated that

approximately 170,000 natives are engaged yearly in tapping and collecting latex from the 50 million trees.

American motorists will soon be riding on concrete highways with rubber filled joints, according to Goodrich. The company's new expansion strip seals pavement joints against moisture and temperature changes which annually damage thousands of miles of highways. The material is economical, easily applied, and will reduce the noise created by vehicles rolling over the usual type of pavement joint, Goodrich engineers declare. Many test installations have been made in Ohio, Indiana, Michigan, and District of Columbia, and the material is now being applied in Tennessee, Mississippi, Louisiana, Georgia, and North Carolina.

Goodrich recently opened its main Silvertown Store in Cleveland at 14th St., Prospect Ave., and Bolivar Rd., with 75 employees. The old Silvertown service and automotive retailing station at Carnegie Ave. and 36th St., has been discontinued. Attending the formal opening of the new super-service station were President Robertson, C. B. O'Connor, general tire sales manager, J. A. Hoban, manager of retail sales, L. C. McGinley, Cleveland district manager, and L. A. Stephens, manager of the new store.

#### Canadian Goodrich Vice President

George W. Sawin, who has spent the entire twenty-five years of his professional career in the service of The B. F. Goodrich Co., was recently appointed vice president and general manager of The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., Canada. Mr. Sawin entered the employ of the firm as a salesman in 1912 upon his graduation from the University of Delaware with the degree of Bachelor of Science in civil engineering. Previously he had attended the Wilmington, Del., High School and Goldey College in that city. Mr. Sawin is a native of Delaware, having been born in Wilmington in 1890.

Continuing as a Goodrich salesman until 1916, Mr. Sawin was made branch manager in that year and district manager in 1924. As district manager, he saw service in many parts of the country, including New York, Philadelphia, and Chicago. In 1926 he became manager of the automobile tire department of Goodrich in Akron, O., and in 1929 returned to the position of district manager in the East, in which capacity he remained until his recent appointment to the Canadian company.

Mr. Sawin is a Mason, a member of Kappa Alpha, Southern, and an honorary member of Phi Kappa Phi.

#### Goodyear Vice President

Good hard work has won for Robert S. Wilson many promotions with the Goodyear Tire & Rubber Co., Akron. At present he is vice president, general sales manager, and a director of the company he joined as a clerk in the



Bachrach

R. S. Wilson

repair department in 1912. Soon after that, sent to Detroit as an adjuster, he was made assistant manager of the service department and then manager. His next promotion, in 1917, placed him in charge of the truck tire department, and by 1921 he was given supervision of sales for the western division extending from Chicago to the Rocky Mountains. Studying advertising in connection with his sales problems, Mr. Wilson so impressed Goodyear officials with his efforts that he was appointed advertising manager in 1927, with office in Akron. The next year saw him become a director, general sales manager, and then vice president. He has also served on the board of the Goodyear Tire & Rubber Co. of California and during the life of the NRA on the trade practice complaints committee for the tire manufacturing industry.

This executive was born in Wooster, O., January 4, 1890. He is a graduate of Pittsburgh, Pa., public schools, Shady-side Academy in Pittsburgh, and Princeton University (B.A., 1910). Mr. Wilson taught at Lawrenceville Academy for two years before his employment by the rubber company.

The General Tire & Rubber Co., Akron, through its directors authorized the issuance of 64,697 additional shares of the company's common stock to present stockholders, rights providing for the purchase of one share for every seven shares already held, at \$20 a share. Par value is \$5. These rights were offered to stockholders of record as of June 18 and expired July 2. This offering brings the total outstanding common stock of the company to 517,572 shares. General Tire stockholders already had approved the proposal to increase the company's common stock from 500,000 to 750,000 shares. Proceeds from the sale of this stock will be used to pay bank loans, to meet accrued preferred dividends, and to provide additional working capital, according to the registration statement.

(Continued on page 76)



George W. Sawin



## OBITUARY

### Myron D. Ettla

**S**TOMACH ailment and complications caused the death, on June 18, of Myron D. Ettla, with the Servus Rubber Co., footwear manufacturer, Rock Island, Ill., since its inception in April, 1923. For many years he was its advertising and sales manager and for the past year was representative in charge of wholesale sales.

The deceased was born April 7, 1892, in Milton, Pa. He was graduated from the local high school and enrolled in Bucknell University for a pre-medical course. Later, however, he decided upon a business career and went to Rock Island about 1911 to become manager of the Elliott-Fisher Co. branch there. Mr. Ettla joined the United States Army, September 23, 1918, and was honorably discharged a corporal March 5, 1919.

He was also an outdoor enthusiast, particularly keen on hunting and fishing. Mr. Ettla belonged to the Hancock Slough Hunting Club, Rock Island Club, Rock Island Chamber of Commerce, American Legion, Masons, Elks, and Lutheran Church.

Funeral services were held June 21. Burial was in Memorial Park Cemetery, Rock Island.

He leaves his wife, a daughter and a brother.

### Harry B. Fogg

**A** CEREBRAL hemorrhage caused the death, on June 10, of Harry B. Fogg, treasurer of the Haverhill Rubber Co., Haverhill, Mass., for the past nine years. The deceased was born March 15, 1892, in Methuen, Mass., and attended school there and in Lawrence.

A bachelor, Mr. Fogg is survived by his parents, two brothers, a sister, and several nieces and nephews. Funeral services were conducted June 13, and interment was in Methuen.

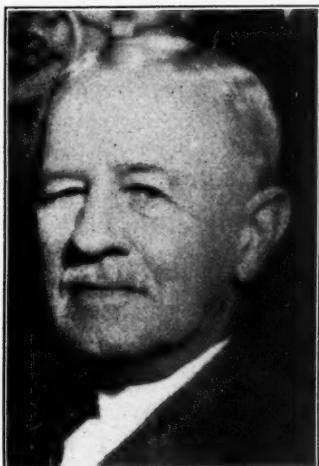
### Wm. T. Teagan

**W**ILLIAM T. TEAGAN, former district manager of the Goodyear Tire & Rubber Co., at Boston, Mass., and affiliated with the company 25 years, died June 3. Mr. Teagan went to Boston from Detroit in 1900 to establish a Goodyear branch and later was instrumental in opening other offices for the company in Portland, Springfield, Providence, and Worcester.

Funeral services were held in Boston June 5. Burial was in Montclair, N. J.

### John R. Dunlap

**J**OHAN ROBERTSON DUNLAP, editor and publisher of many engineering and management books and magazines over a long period of years and associated with the founding of *INDIA RUBBER WORLD* in 1889, died in New York, N. Y., June 5. He was born in



John R. Dunlap

Lexington, Ky., April 11, 1857, and attended Linsly Institute, Wheeling, W. Va. In 1873 he engaged in civil engineering work, but later turned to the publishing business.

Mr. Dunlap belonged to the American Society of Mechanical Engineers, Taylor Society, Kentucky Society of New York, Society of the Army of the Cumberland, Society of the Cincinnati, Sons of the American Revolution, Democratic Party, Unitarian Church, and New York Athletic and Greenwich Country clubs.

Twice a widower, the deceased is survived by a daughter and two sons. Funeral services and interment took place in Lexington on June 7.

### Sir Eric Geddes

**A**S WE were going to press, word came from abroad of the death, on June 22, of Sir Eric Geddes, 61, chairman of Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham, England. His obituary will appear in our next issue.

### Rhode Island Rubber Club

(Continued from page 58)

third. The "blind bogey" was won by F. E. Rupert, with Arthur Davis second and J. Christopher third. In addition to those named as heading the lists, at least a score of other prizes were distributed to the golfers together with a like number of door prizes. After an excellent steak and lobster dinner at the club, the annual election of officers was held. The nominating committee made a fine gesture in naming Samuel Tinsley as president in recognition of his excellent work as secretary-treasurer, but owing to the fact that he was leaving Rhode Island to take a position outside the state, Mr. Tinsley was forced to refuse the

office. They then proceeded to elect Ezra L. Hanna, Davol Rubber Co., president; Charles Berlow, American Wringer Co., secretary-treasurer, and an executive committee consisting of: John Marshall, Collyer Insulated Wire Co.; Gladding Price, R. T. Vanderbilt Co.; Carl Short, United States Rubber Products, Inc.; D. C. Scott, Jr., Henry L. Scott Co.; F. E. Rupert, Anaconda Wire & Cable Co.; Ray Newell, Respro, Inc.; A. L. Lingley; and Dr. F. D. Chittenden, U. S. Rubber Products.

The feature of the evening was the spirited discussion of the relative merits of mills and Banburys for mixing rubber compounds, with D. H. Davidson, of Farrel-Birmingham Co., Inc., championing the mills and Don A. Comes, of the same company, defending the Banburys. It appeared that each type of mixing equipment had its particular merits under certain conditions and for specific purposes.

The session ended with a talk and motion pictures relating to the development and conservation of fish, game, and other wild life in New Hampshire.

Those who donated prizes for golf and door awards included: Anaconda Sales Co.; Ansbacher-Siegle Co.; American Zinc Sales Co.; Akron Standard Mold Co.; L. Albert & Sons; Binney & Smith Co.; Godfrey L. Cabot, Inc.; E. I. du Pont de Nemours & Co., Inc.; Wm. D. Egleston; General Atlas Carbon Co.; Halowax Corp.; C. P. Hall & Co.; J. M. Huber, Inc.; *INDIA RUBBER WORLD*; D. H. Litter Co.; Monsanto Chemical Co. (Rubber Service Laboratories); Naugatuck Chemical; Moore & Munger; H. Muehlstein & Co.; Industrial Paper & Cordage Co.; New England Paper Tube Co.; New Jersey Zinc Co.; Pequannoc Rubber Co.; Philadelphia Rubber Co.; Philipp Bros.; *Rubber Age*; Stamford Rubber Supply Co.; A. Schulman, Inc.; Wm. R. Thropp & Sons Co.; Titanium Pigment Co.; United Carbon Co.; L. G. Whittemore Co.; C. K. Williams & Co., and G. E. Wilson Co.

### Witco Golf Trophy

Competition in the Rhode Island Rubber Club Golf League, composed of teams from various rubber companies in that state, was stimulated recently by the acquisition of the Witco Challenge Cup, a gift of Wishnick-Tumpeier, Inc., 295 Madison Ave., New York, N. Y. The cup will be held each year by the team that wins the league championship. The first team to win it twice will have permanent possession. The teams, each consisting of six men, meet every Saturday morning, during April, May, and June at various courses in Rhode Island. At the present time the Anaconda Wire & Cable Co.'s team is in the lead with a likelihood of winning the first leg on the cup. The final match will be climaxed by a banquet of all the groups at which the Witco cup will be presented.

## RUBBER BIBLIOGRAPHY

OBTAINING NATURAL LATEX FROM RUBBER-BEARING PLANTS. A. Ignatiev, *Sovet. Kautschuk*, 3, 22-26 (1935).

INFLUENCE OF TIME ON THE ELONGATION OF SOFT RUBBER UNDER SPECIFICALLY SMALL LOADS. W. W. C. Everts, *Kautschuk*, May, 1937, pp. 68-70.

ACTION OF DISPERSERS IN LOADED MIXES. J. Behre, *Kautschuk*, May, 1937, pp. 70-82.

FIRE RESISTANCE OF RUBBER. F. JACOBS, *Rev. gén. caoutchouc*, Feb.-Mar., 1937, pp. 5-8.

BONDING RUBBER TO METAL. M. Farberoff and collaborators, *J. Rubber Ind. (U.S.S.R.)*, 8-9, 901 (1936). Abbreviated translation by L. G. Akobjanoff, *Rev. gén. caoutchouc*, Feb.-March., 1937, pp. 9-13.

LATEX, LIVING SUBSTANCE. L. Morrissey, *Rev. gén. caoutchouc*, Feb.-Mar., 1937, pp. 17-21.

CONTROL OF HYDROGEN-ION CONCENTRATION IN THE RUBBER INDUSTRY. M. Deribere, *Rev. gén. caoutchouc*, Feb.-Mar., 1937, pp. 23-24.

IMPORTANCE OF SYNTHETIC AND MOLDING MATERIALS FOR THE BUILDING TRADE. Prof. Burgel, *Gummi-Ztg.*, May 7, 1937, pp. 429-32.

1886-1936: DEVELOPMENT OF THE RUBBER INDUSTRY AS REFLECTED IN THE *Gummi-Zeitung*. *Gummi-Ztg.*, May 21, 1937, pp. 485-86.

REENFORCEMENT OF RUBBER BY GAS BLACK. W. Esch, *Kautschuk*, 13, 41-42 (1937).

PROPERTIES OF HARD RUBBER. II. Scleroscope Resilience. H. F. Church, *J. Rubber Res.*, 6, 9-12 (1937).

ARTIFICIAL RUBBER. H. Lamel, *Osterr. Chem. Ztg.*, 40, 127-32 (1937).

EXAMINATION AND STORAGE OF RUBBER PARTS FOR GAS MASKS. D. J. van Wijk, *Chem. Weekblad*, 34, 163-67 (1937).

RETIRES MAKE GOOD UNDER UNUSUAL OPERATING CONDITIONS. L. Whitman, *Rebuilt Tire J.*, June, 1937, p. 12.

CRUDE AND RECLAIMED RELATIONSHIP EXPLAINED BY MARKET EXPERT. A. J. Bourrienne, *Rebuilt Tire J.*, June, 1937, pp. 13 and 29.

DETERMINATION OF FREE CARBON IN RUBBER GOODS. E. W. Oldham and J. G. Harrison, Jr., *Ind. Eng. Chem. (Anal. Ed.)*, June 15, 1937, pp. 278-79.

INSTRUMENTATION IN THE RUBBER INDUSTRY. R. Trautschold, *Rubber Age (N. Y.)*, June, 1937, pp. 167-70.

WRITING RUBBER FORMULAE. F. N. Upham, *Rubber Age (N. Y.)*, June, 1937, pp. 171-72.

SELECTION, INSTRUCTION AND TRAINING OF MEN. T. G. Graham, *Rubber Age (N. Y.)*, June, 1937, pp. 173-76 and 184.

ELECTROFORMING IN THE MAKING OF MOLDS AND DIES. J. G. Malone, *Rubber Age (N. Y.)*, June, 1937, pp. 177-78.

DRYING MACHINERY DEVELOPMENT. *Rubber Age (N. Y.)*, June, 1937, pp. 179-81.

FIRST PNEUMATIC RUBBER TIRE. P. W. Barker, *Rubber Age (N. Y.)*, June, 1937, p. 183.

NOMENCLATURE OF CARBON PIGMENTS. J. R. Scott, *India Rubber J.*, June 12, 1937, pp. 12-14.

PRODUCTION OF PLASTIC MATERIALS. H. Barron, *India Rubber J.*, May 8, 1937, pp. 4 and 6; May 29, pp. 11-12; June 5, pp. 14-15.

STORY OF SYNTHETIC RUBBER. W. J. S. Naughton, *India Rubber J.*, May 8, 1937, p. 7.

OIL RESISTANCE OF RUBBER. IV. Mechanism of the Oil Resistance of Neoprene. S. Kambara, *Rubber Chem. Tech.*, Apr., 1937, pp. 312-16.

RUBBER SOFTENERS. *India Rubber J.*, May 15, 1937, pp. 8-9.

SOFT VULCANIZED RUBBER. Effect of Temperature and Oxygen Pressure on Aging Rate. J. H. Ingmanson and A. R. Kemp, *Rubber Chem. Tech.*, Apr., 1937, pp. 336-45.

PURIFIED RUBBER FOR ELECTRICAL INSULATION. A. R. Kemp, *Ind. Eng. Chem.*, June, 1937, pp. 643-49.

RUBBER PRODUCERS AND NATIONAL DEFENCE CONTRIBUTION. *Rubber Age (London)*, June, 1937, p. 112.

GAMBLING AND THE RUBBER MARKET. O. Latham, *Rubber Age (London)*, June, 1937, pp. 116-17.

WOODFLOUR IN RUBBER COMPOUNDING. H. Barron, *Rubber Age (London)*, June, 1937, pp. 119-21.

DISTRIBUTION OF RUBBER IN RUBBER-BEARING PLANTS. A. Prokofiev, *Sovet. Kautschuk*, 1, 19-23 (1935).

COMPLETE UTILIZATION OF RUBBER-BEARING PLANTS. D. Kraft, *Sovet. Kautschuk*, 4, 44 (1935).

DETECTION AND DETERMINATION OF SOME SPECIAL IMPREGNATING MATERIALS IN PAPER. F. Burgstaller, *Papier Fabr.*, 35, 46-48, 52-54 (1937).

APPLICATION OF ALKYD RESINS. *Farben-Chem.*, 8, 82-84, 91 (1937).

RESINS. XXVI. Almeidaia Gutta Resin. XXVII. A Recent Congo Copal. E. Stock, *Farben-Ztd.*, 42, 259-60 (1937).

## BOOK REVIEWS

(Continued from page 60)

technical man can obtain a complete and clear view of the importance of chemistry.

The chapter "Wheels and Wings" brings out the point that the advancement of the automobile was probably due to the development of the pneumatic tire rather than to the necessity of using the by-product gasoline as many were reported to have believed. The story of automobile tire advancement mentions the improvements in rubber compounding through the use of accelerators, antioxidants, etc. A small table shows the increase in average tire mileage from 4,000 miles in 1906 to 15,000 miles in 1934. Another table covering 1920 to 1934 shows the trends in tire costs per 10,000 miles, the number of vehicle registrations, and annual savings in tire costs based on 1920 quality and cost.

The last chapter, "The Crystal Reveals," discusses the imminent potentialities based on performances and trends to date.

"The Reactions of Pure Hydrocarbons." Gustav Egloff. 898 pages. 6 by 9 inches. Authors and Subjects Indexes. Published by Reinhold Publishing Corp. Price, \$16.75.

This book is one of the American Chemical Society monogram series and is an attempt to present in one volume all the work on the reactions of pure hydrocarbons. There are seven chapters, one for each distinct hydrocarbon group: Paraffins, Olefins, Acetylenes, Aromatics, Cycloparaffins, Cycloolefins, and Terpenes. Under each group is discussed thermal, electrical, and catalytic reactions, the reactions toward various agencies and with other hydrocarbons or with unrelated substances.

At the beginning of each chapter is an introduction and a discussion, the theory and mechanism of formation for each group. Tabulated summaries follow each subdivision within the group. At the end of each chapter is an extended bibliography. Six pages on rubber as a hydrocarbon are included in the terpene chapter.

## EASTERN

(Continued from page 66)

formerly salesman in the Seattle district succeeds Mr. Gilmer as manager of mechanical sales there.

The company has announced its vacation shutdowns as follows: Naugatuck, Conn., footwear plant, July 3 to 19; Passaic, N. J., mechanical goods, July 3 to 13; Detroit, Mich., tire factory, first week in August. Employees with the company a year or more will be paid for one week's vacation.

M. A. Clark, industrial relations manager at the Detroit plant, received the honorary degree of master of industrial engineering at the recent commencement of the Lawrence Institute of Technology in Detroit. While Wm. G. Nelson, divisional manager in the production control department of the same plant was awarded the honorary degree of doctor of science at Ottawa University, Ottawa, Kan., in recognition of his research work in the rubber industry.

## Permabond Protective Linings

Permabond, a rubber material, is now available where resistance to corrosion, diffusion, abrasion, and electrical conductivity is required. This material is especially useful for lining pickling, plating, and bleaching equipment for sewage disposal units where ferric chloride is used, and for chemical equipment in general. United States Rubber Products, Inc., 1790 Broadway, New York, N. Y.

# Rubber Industry in Europe

## GREAT BRITAIN

### Research Board

The British Rubber Research Board was set up to take charge of the British section of research and development of new uses for rubber in connection with the International Rubber Regulation Agreement. The members of the board are: P. J. Burgess; W. J. Gallagher; W. N. Haworth, professor of chemistry at the University of Birmingham; H. Eric Miller, chairman, Harrisons & Crosfield, Ltd.; E. K. Rideal, professor of colloid science, University of Cambridge; Sir Frank Stockdale, agricultural adviser to the Secretary of State for the Colonies and chairman, Imperial Institute Advisory Council on Plant and Animal Products. Mr. Burgess and Mr. Gallagher were nominated by the Rubber Growers' Association. The other members were nominated by the Secretary of State for the Colonies on behalf and with the consent of British rubber-producing countries. Mr. Miller has been elected chairman and Sir Frank Stockdale vice chairman of the board.

### Vulcaplas

Vulcaplas is a new vulcanizable plastic recently put out by the Dyestuffs Group of Imperial Chemical Industries, Ltd., for use in rubber compounding. It should be regarded as a new raw material, states the manufacturer, and it is supplied only as an uncompounded product. It is claimed to be odorless and is said not to give off objectionable fumes during processing; it is resistant to most solvents, to oils, and especially to vesicant liquids. It can be mixed with natural rubber or with Neoprene to give compounds of outstanding oil resistance. Vulcaplas differs from Neoprene in that it does not in itself possess the elongation and tensile strength of natural rubber. As it is thermoplastic, it cannot be successfully used under working conditions where temperatures exceed 70° C.

### Footwear Competition

Competition of Empire countries with the United Kingdom is a sore subject constantly being brought to the fore in the press and in Parliament. Recently the question was asked in the House of Commons as to what were the amounts and value of rubber footwear imported during 1936 from Hong Kong and Canada and how many persons in the United Kingdom would have received direct employment if

these goods had been manufactured locally. In his reply Mr. Runciman, president of the Board of Trade, revealed that Hong Kong sent 294,000 dozen pairs, value £191,000, and Canada, 452,000 dozen pairs, value £762,000. He could not supply information as to the amount of employment that would have been provided if this footwear had been made in Great Britain.

### Wood Flour in Rubber Compounding

Although wood flour has been widely used as a filler for plastics for many years and under conditions which in many respects are similar to those in rubber manufacture and in some cases are even more exacting, its possibilities as a filler for rubber have only recently begun to be appreciated. Harry Barron states in a recent issue of the *London Rubber Age*. Wood flour has been neglected in the past chiefly because it is too coarse in comparison with other fillers for rubber and because it tends to discolor light mixes at the usual vulcanization temperatures if curing is at all prolonged. The first disadvantage no longer exists, for today wood flour as fine as 200-mesh is obtainable, and the modern trend toward shorter cures at lower temperatures will help to overcome the second; in fact it is this trend which makes a consideration of wood flour worthwhile.

For the rubber manufacturer one of the chief interests in the use of wood flour lies in its cheapness; its density is comparable to that of rubber, and its volume cost is very low, being on a level with that of whiting and the cheapest clays. Apart from this point, it mixes well with latex and has been found useful in latex-cement mixes. Stevens and Stevens, experimenting with compounds for rubber flooring a few years ago, reported wood flour was the best all-round fibrous vegetable filler. They specifically recommended it for use as the primary filler in a new type of rubber flooring and also pointed out that its presence in rubber-mineral mixes tended to prevent the formation of bubbles.

Mr. Barron himself has for some time been working with wood flour and finds that as a compounding ingredient it shows up best when used in quantities up to the equivalent of the rubber. His findings indicate that wood flour is an inert filler having no effect on tensile properties; its abrasion resistance is no worse than that of most

inert fillers and its tearing properties are better than those of China clay and as good as those of whiting. Wood flour from soft woods like pine has a softening effect on the final product; while wood flour from hard woods like oak gives a harder product. A disadvantage of wood flour is that with large volume loadings it tends to be hygroscopic, but this is not the case with smaller loadings.

Perhaps the outstanding technical advantage of wood flour, says Mr. Barron, is its ability to take up any gases in a mixing and thereby reduce porosity. Small volume loadings, up to 25% of the rubber, have a remarkable effect in eliminating this trouble in ordinary mixings, and although not too well-known, wood flour is already widely used for this purpose. Up to 10% it is very useful in ebonite mixings to remove any gases that may be formed.

### Rubber in Railways

The Propaganda Committee of the Rubber Growers' Association is to publish a new edition of the handbook dealing with the use of rubber in railways. A special section of the book will be devoted to light railways. The chief advances in light railways are largely in connection with the Michelin rail coaches. A note in the Rubber Growers' Association bulletin reads that the latest Michelines have place for 150 passengers, 100 seated and 50 standing. Now 90 such rail coaches are in France and another 10 in French colonies, and that the total mileage of these vehicles already exceeds 8,750,000 miles.

The newest Micheline is almost 100 feet long; it has two compartments for passengers, one on each side of the luggage van in the center. It is specially constructed so as to combine lightness with strength, and the total weight of the entire girder chassis assembly is only 2 tons 15 cwt. The new Micheline has 24 wheels fitted with special pneumatic tires which are practically puncture-proof and give about 22,000 miles of satisfactory service. The normal speed is 75 miles per hour, and the maximum, 85 miles per hour.

## FRANCE

The value of exports of rubber goods from France increased from 158,069,000 francs in 1935 to 165,348,000 francs in 1936, but the quantity remained con-



stant at 12,272 tons. More than half these exports go to the French colonies which bought 7,327 tons, value 96,796,000 francs, in 1936, against 6,926 tons, value 89,687,000 francs, in 1935. Foreign countries took 4,945 tons, value 67,552,000 francs, against 5,437 tons, value 68,382,000 francs. The chief exports, tires and tubes, amounted to 7,728.2 tons, value 105,063,000 francs, against 7,265.3 tons, value 94,903,000 francs. Algeria was the best customer, taking 1,746.4 tons. Cycle tires and tubes totaled 1,247.2 tons, value 15,283,000 francs, against 1,262.2 tons, value 15,583,000 francs. Footwear exports declined from 803 tons, value 9,466,000 francs, in 1935, to 717 tons, value 7,340,000 francs, in 1936; and other rubber goods were 1,531 tons, value 17,590,000 francs, against 1,685 tons, value 16,757,000 francs in 1935. But sanitary goods were 23 tons, value 906,000 francs, against 20.5 tons, value 499,000 francs; garments and other articles of rubberized fabric were 128.4 tons, value 4,316,000 francs, against 90.5 tons, value 3,456,000 francs. Waste rubber exports rose from 1,938.3 to 4,511.5 tons.

## GERMANY

In addition to the import duty of 125 marks per 100 kilos recently imposed on crude rubber, German duties on reclaimed rubber and practically all rubber manufactures including semi-manufactures except tire casings for motor vehicles have been drastically raised by a new order effective June 3, 1937. At the same time new duties have been established for latex; when the dry rubber content is below 42%, the duty is 50 marks per 100 kilos; from 42 to 62%, 75 marks; 62 to 77%, 100 marks.

In the above the reference is probably to old tire casings which are to be reclaimed in Germany and thus augment the supply of natural rubber. In this connection it will be recalled that factice and other rubber substitutes, waste from rubber, gutta percha and balata, are not subject to the prohibitive tax on crude rubber, but enter duty free as before.

The unusually high duties imposed by the German government have given rise to considerable speculative comment especially in foreign countries. It seems to be agreed abroad that the ostensible purpose, at least of the duty on raw rubber to provide funds for the manufacture of Buna on a large scale, is not the true one, if only for the reason that so high a duty would cause such a steep drop in the imports of crude rubber as would more or less defeat its aim. Germany has for long been vainly agitating for the return of her colonies; hence it is assumed in some quarters that the measures are in the nature of a demonstration—to put it mildly—to bring home to producers of raw materials what the effect of Germany's abstention from purchasing im-

portant quantities of raw material might be.

There may be something in this argument. Germany has in the last few years imported ever-increasing quantities of raw rubber. During 1936 she bought 734,150 quintals, against 651,352 quintals in 1935. In the first quarter of 1937, the rubber imports came to 230,443 quintals, or at the rate of almost 1,000,000 quintals for the entire year. During the same period imports of old tires also mounted. While there were these sharp increases in raw rubber imports, on the other hand, the government issued a steady succession of orders restricting the use of raw rubber for home consumption. Goods for exports were exempt from these orders. But certainly the exports of rubber manufacture at 141,222 quintals in 1935 and 168,951 quintals in 1936 did not require more than about one-fifth of the crude rubber imported in each of those two years. The logical inference follows that Germany has been accumulating large reserves of rubber, probably both in crude and manufactured form, and fortified with the knowledge that she has such stocks behind her, if the argument is correct, Germany feels strong enough to risk a bold gesture.

## POLAND

Activity in the Polish rubber industry has undergone considerable change in the last few years. In 1933 and 1934 the production of rubber footwear was still the chief mainstay of the manufacturer; the value of the exports of these goods was 2,809,000 zloty and 2,754,000 zloty respectively. Footwear continues as an important article of production, but exports have dwindled until in the first quarter of 1937 they were only 26 tons, value 101,000 zloty.

Today manufacturers are turning out more tires, mechanical goods, and sanitary goods; in fact they are in a position to satisfy the greater part of the home demand for these goods and even export small quantities of some items. Consequently imports of rubber goods, especially tires, which constitute the bulk of the purchases from abroad, are constantly declining. In the first quarter of 1937 imports of tires and other rubber goods came to 212 tons, value 822,000 zloty. In 1933 tire imports were valued at 5,334,000 zloty.

Against the decrease in the imports of manufactured rubber must be put a steady increase in crude rubber imports, which for the first quarter of 1937 were 1,482 tons, against 1,179 tons for the corresponding 1936 quarter. Not only the manufacture of tires shows progress, but the output of hygienic goods has made forward strides. The improvement is primarily due to the efforts of a single manufacturer who has modernized his equipment and engaged a foreign expert.

Business in the Polish rubber industry appears to have improved during

1936 if one may judge from the increased consumption of crude rubber and the business reports of several rubber and cable manufacturers. The Fabryka Kabli, Cracow capitalized at 10,000,000 zloty, reported net profits of 877,370 zloty and paid a 4% dividend; while the Kabel A.G., Warsaw, capital, 2,878,000 zloty, had net profits of 101,759 zloty. F. W. Schweikert, Lodz, for several years reported a loss; for 1936 there again was a loss, of only 65,039 zloty, whereas in the two preceding years the loss amounted to over 200,000 zloty on each occasion. Leonowit Asbestos & Rubber Factory, Lodz, established only a few years ago, showed a profit of 106,839 zloty on a capital of 350,000 zloty last year. The Wargum Rubber Factory, Warsaw, made a profit of 35,849 zloty on its capital of 500,000 zloty.

## CUBA

Cuban presidential decree No. 1,364, May 4, 1937, modifies Cuban customs tariff subitem 78-C (India rubber and gutta percha) and adds subitem 78-D so as to classify specifically both natural rubber and regenerated rubber, according to a report from Commercial Attaché Walter J. Donnelly, Habana.

The rate of duty heretofore applying to subitem 78-C, namely 70¢ per 100 gross kilos plus a surtax of 3% of the duty in the case of United States merchandise, will apply to subitem 78-D also. Formerly regenerated or reclaimed rubber was classified under Cuban customs tariff item 307-K, with a duty of \$16.25 per 100 kilos plus a surtax of 3% of the duty in the case of United States merchandise.

## Pliolite in Paint

Pliolite as a dry material and made from a rubber derivative is being sold to paint manufacturers as a raw material. Paints made from Pliolite are especially resistant to acids, alkalies, water, and moisture vapors. Pliolite paints or enamels, when properly applied to concrete floors, new or old, greatly increase the wear resistance. The first coat penetrates into the cement and thus forms a firm bond for the subsequent coats. Pliolite enamel is dry to touch one hour after applying and can be subjected to light traffic within two to six hours, although the maximum bond to the concrete does not develop until after five days. Goodyear Tire & Rubber Co.

## Patent Suit

1,881,276, W. E. Humphrey, Method of fabricating beads for pneumatic tires; 1,821,470, same, Bead-forming mechanism; 1,760,411, same, Bead cutting mechanism, D. C., N. D. Ohio, E. Div., Doc. 5112, *The Mason Tire & Rubber Corp. v. The B. F. Goodrich Co.* Dismissed April 1, 1937.



# Rubber Industry in Far East

## NETHERLAND INDIA

### Plantation Gutta Percha

For all practical purposes it may be said that the Government Gutta Percha Plantation Tjipetir, West Priangan, Java, is the only enterprise of its kind; although two estates in East Coast Sumatra report gutta percha plantations covering 166 hectares, but statistics indicate that only in 1934 was the small output of 160 kilos harvested here. Tjipetir, on the other hand, has an area of 1,139 hectares and has for several years given an output of around 100 tons of first-quality gutta percha. Available figures covering the years 1931-1935 inclusive show that the highest quantity harvested was 135,490 kilos in 1932. In 1935 the output came to 111,092 kilos. Exports in 1931 totaled 120 tons, but owing to the depression, fell steeply in the two succeeding years when they were only 90 and 44 tons respectively. In 1934 shipments were up to 147 tons and in 1935 to 171 tons.

The manager of the government estate has made strenuous efforts to develop markets for plantation gutta percha and is meeting with success in Japan, the United States, and England, from which countries an increased demand has of late been reported. It appears that the new interest in gutta percha is due to the planned extension of overseas telephone communication by various countries and the consequent need of submarine cables. Telephone communication between England and the Continent of Europe is to be greatly extended, it is learned; while reports considered reliable state that plans for a telephone cable between England and the United States are taking definite shape.

Fair amounts of wild guttas are exported from the Outer Provinces, chiefly Southern and Eastern Borneo. In 1935 the exports of these guttas, which included such types as gutta hangkang, gutta merah, gutta ketjau, gutta suntik, etc., came to 1,987 tons.

### Rubber Exports

The Central Bureau of Statistics issued the following figures for rubber exports from Java and Sumatra in March, 1937:

Estate rubber from Java and Madura came to 7,927,087 kilos dry including 11,301 kilos latex, against 5,222,126 kilos in February. In addition were shipped 9,310 kilos of tires and 903 kilos of tire scrap.

Estates in the Outer Provinces sent 13,335,859 kilos, including 1,142,113 kilos latex, against 9,086,005 kilos the

month before; while native rubber came to 20,322,649 kilos against 13,249,258 kilos. In all, the March exports were approximately 52% over the February total.

April showed declines. Provisional figures for Java and Madura total 7,105,000 kilos, including 8,078 kilos of latex and 6,476 kilos of rubber goods; estates in the Outer Provinces shipped 10,331,664 kilos, including 1,038,213 kilos of latex and 119,876 kilos of sprayed rubber. Native rubber exports totaled 16,227,471 kilos, of which 5,913,596 kilos were factory made. The total shipments for April thus came to 33,664,135 kilos.

### Tree Census

Results of the native rubber tree census follow:

<b>Trees</b>	
Total trees .....	581,000,000
Tappable trees tapped .....	232,000,000
Tappable trees untapped .....	209,000,000
Untappable (immature) .....	140,000,000
<b>Areas</b>	
Total area, in hectares .....	680,000
Total tappable area, hectares .....	629,000
Untappable .....	51,000
<b>Classification of tappable areas</b>	
Good, hectares .....	28,000
Fairly good .....	111,000
Mediocre .....	253,000
Poor .....	135,000
Neglected .....	102,000

No data on yields or potential production of these areas have been given.

### Demand for Latex Cups

Recently an enormous increase in the demand for latex cups was reported. Importers ran out of stocks and had to wire for hundreds of thousands of cups which they sold out almost immediately and then they had to wire for as many more as the factories could send. It seems that this sudden demand for cups was caused by the fact that many planters, fearing that they would not be able to fill quotas by adhering to the prevailing tapping systems, which are chiefly alternate daily tapping and third daily tapping, have switched over to daily tapping. It would be worthwhile knowing how many estates have had to drop their more conservative tapping methods in order to produce their allotted amounts of rubber.

### Goodyear Executive Sails

R. W. Hadley, managing director of the Goodyear factory at Buitenzorg, Java, sailed for the United States via Singapore and Shanghai. Mr. Hadley, accompanied by his wife, left on May

5 to attend a conference at the Good-year company in Akron, O. He plans to be absent four to five months and in the meantime his place will be taken by D. Gow, director and secretary, and H. I. Belknap, director and general superintendent.

## JAPAN

While Japan's crude rubber imports for the first half of 1936 declined 6.8% as compared with the corresponding half of 1935, the net imports for the second half of 1936 were 21% higher than in the first half so that in the end imports for the entire year were 7% above the total for 1935. The unlooked-for rise is variously explained as due to increased domestic consumption, higher military requirements, the desire to accumulate stocks because of the higher prices and fears of inflation. Probably each of these factors played a part in the upward movement which also included scrap rubber, imports of which rose from 790 tons in 1935 to 2,250 tons in 1936.

The trend of exports was mixed; while shipments of tires and footwear dropped considerably, those of rubber toys and several other rubber goods increased in value. Locally wholesale prices of rubber goods rose, especially footwear, raised for the third time.

The Japanese have been very active in their efforts to produce synthetic rubber, but so far do not appear to have been quite successful; at least a prize of 10,000 yen which has been offered by the Imperial Invention Association to the inventor of a useful process still remains unclaimed. At the same time, Japanese are showing increased interest in rubber growing.

A report from Tokyo states that the Nanyo (South Sea) Rubber Co. plans to buy foreign-owned plantations in Malaya. This company, with capital of 2,000,000 yen and head offices in Tokyo, operates a number of plantations chiefly in Johore (Malaya) and Sumatra, which at present produce about 1,300,000 pounds per annum. Last year a group of important Japanese concerns was said to have raised 5,000,000 yen to acquire rubber estates in Siam.

Japanese claim that they now occupy fourth place among the nations growing rubber in the Far East. They have invested 85,000,000 yen in rubber plantations and in 1935 had 130,000 acres under rubber which produced 13,000 tons.

## MALAYA

### Buddings Disappointing?

From some reports it becomes apparent that companies are in no hurry to tap their buddings. Various interpretations have been put on this tendency. It is frequently suggested that budded trees are not coming up to expectations. In fact the chairman of Mengkibol Rubber Co. freely stated that a large assessment had been given his company for 1937 for 560 acres of budded rubber which the manager considered "commercially untappable," and he added that from reports from the East this appeared to be representative of the general condition in Malaya.

Until we have definite facts to go by, it is probably best to assume that in most cases companies are really merely pursuing a safe tapping policy in refraining from tapping buddings as long as possible to insure a robust stand of high-yielding trees a few years later. Despite what advocates say, buddings are definitely more delicate than seedlings; and since much money has been invested in them and much is expected from them, it appears prudent to delay tapping until the trees are older and stronger and, at the same time, their inherent yield power has developed beyond the natural limits imposed by their young age.

### Companies Improving

In the spring many companies issue financial reports which summarize the achievements during the past year and plans for the ensuing year. After the long slump rubber estate reports for 1936 make cheerful reading; higher income all round; payments of dividend resumed and in many cases considerably increased; reserves strengthened; salaries and wages raised; bonuses to the staff; large sums spent on improvements in cultivation, in erecting new buildings, modernizing factories and equipment.

With higher prices and higher quotas come certain changes in estate policy. Various companies among those who had embarked on replanting programs have postponed this work largely in order to be able to meet the increased quota without having to abandon conservative tapping systems; for others the desire to maintain their productive capacity at a maximum and so benefit as much as possible from the price situation has been the chief motive. Thus we see the high prices to a certain extent bring with them their own antidote. We find that companies on the whole express confidence in their ability to fill their quotas.

Many companies have made forward sales for 1937 and 1938. A British paper published a list showing 185 companies with total forward sales for 1937 amounting to 81,542,663 pounds and 78 companies with forward sales

for 1938 aggregating 20,871,023 pounds.

Scottish Malayan Estates, Ltd., recently acquired Teluk Gong Rubber Co. and now has 8,549 acres under rubber. The company replanted 284 acres in 1936 and will replant 172 acres more. No difficulty is expected in harvesting the exportable crop, which for 1937 is fixed at almost 3,000,000 pounds. Including forward sales, almost half the exportable has been sold at prices averaging 9½d. per pound. In addition 144 tons were sold at 1s. per pound for 1938 shipment. A dividend of 6% was paid.

Ayer Panas Rubber Estate, Ltd., is almost 30 years old. Of its 2,921 acres under rubber, 2,097 acres are 12 years old and over. During 1936, 100 acres were replanted and 50 acres will be added in 1937. This company sells its crop to the Dunlop Rubber Co., Ltd., in the form of latex. For 1936 it paid a dividend of 11¼%.

Changkat Serdang spent \$10,900 (Straits currency) in 1936 on replanting 70 acres of old rubber and had planned to cut out 42 acres more in 1937. But this work has been postponed till 1938 to permit the increased 1937 allowance to be harvested on the present conservative tapping policy. The company is to install a modern sheeting battery during the current year. It paid a dividend of 10% in 1936.

New Serendah Rubber Estates, Ltd., is not replanting until it is known whether planting in virgin jungle will be permitted. New buildings are being erected, and the latest and most economical machinery is to be installed.

Utam Simpan Rubber Co. in 1936 paid a 10% dividend, against 2% in 1935. This company also built a new factory last year.

The Sempah Rubber Estates sold forward 165 tons for 1937 at an average price of 8.91d. per pound and 150 tons for 1938 at 10.30d. per pound. The company is able to produce 100% of standard or more without departing from the conservative tapping policy it has followed for years. The chairman favors continued restriction. Regarding the sudden price rise, he said that although it was gratifying, it had its disadvantages. There were limits beyond which prices could not go without threatening the future prospects of the industry. Furthermore labor had become unsettled and was making the working of estates difficult.

North Malay Rubber, Ltd., is also in a position to produce full quota. The chairman pointed out that since export licenses still command a price of 4d. per pound in the East, many other estates must be producing more than their export allowance and covering their excess production by buying licenses. Last year North Malaya spent £2,230 to buy export rights. The concern paid a 7½% dividend and dis-

tributed bonuses totaling £450 to managers and assistants.

Labu (F.M.S.) Co. reports that assessment for 1937 has been substantially raised because of the increased maturity of the Glendale budded area. But tapping here is to continue on a restricted basis so as to allow the young buddings the benefit of uninterrupted growth. The buddings, particularly in their early years, demanded special care in tapping, the chairman said, and the treatment of these valuable young trees would determine whether or not an adequate return was to be received on the capital sunk in them. Hence it was decided to forego maximum crops at present.

## CHINA

Wing-On Co., Ltd., which operates department stores, textile mills, and banks in Hong Kong and China, plans to grow rubber on Hainan Island.

## OHIO

(Continued from page 70)

### Rubber Lubricant

A new lubricator for molds, when vulcanizing, and for uncured stock, when being handled, known as Lubrex, was announced recently and, according to reports, is proving very effective. Without building up a detrimental film in the mold, this lubricant prevents sticking of the stock to the mold and allows the mold plates to separate easily when the product is being removed. According to the manufacturer, light colored articles are not discolored by its use, but the products take on a gloss which has very much the same effect as is produced by a varnish. Lubrex does not undergo any chemical action during the cure and therefore does not affect the rate of vulcanization. It is said to be effective in preventing adhesion of warm stock as it comes from the mill or tubing machine. The manufacturer recommends a 2% solution in water for use on molds or press platens and 3% when applied to unvulcanized stocks. Standard Chemical Co., Akron.

Eagle-Picher Lead Co., Cincinnati, has announced the resignation of Vice President John R. MacGregor, with the firm 28 years. His present plans include a vacation with his family before resuming active work.

Firestone Tire & Rubber Co., Akron, has appointed Lawrence Eyre, Philadelphia truck tire manager to succeed E. J. Sweeney, who was made truck tire manager of the eastern zone.

# Patents and Trade Marks

## MACHINERY

### United States

- 2,078,439. **Toy Apparatus.** J. W. Blackledge, Chicago, Ill.  
 2,078,588. **Press Deflating Mechanism.** J. F. Smith, Quincy, Mass., assignor to Compo Shoe Machinery Corp., New York, N. Y.  
 2,078,777. **Processing Rubber.** J. W. Schade, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.  
 2,078,913. **Form for Hollow Articles.** S. I. Strickhouser, Providence, and E. J. Joss, Cranston, both in R. I., assignors to United States Rubber Co., New York, N. Y.  
 2,079,557. **Apparatus for Producing Carbon Black.** J. J. Jakosky, Los Angeles, Calif., and V. F. Hanson, Niagara Falls, N. Y., assignors to Electroblacks, Inc., Culver City, Calif.  
 2,079,585. **Tire Tester.** C. M. Sloman, Detroit, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.  
 2,079,826. **Vulcanizer.** N. Van Cleef, assignor to Van Cleef Bros., both of Chicago, Ill., consisting of N. F. M., and P. Van Cleef.  
 2,080,398. **Winder.** H. E. Cooper, Providence, R. I., assignor to United States Rubber Products Inc., New York, N. Y.  
 2,081,096. **Tire Bead Reenforcer.** S. A. Reed, Duxbury, assignor to Plymouth Cordage Co., Plymouth, both in Mass.  
 2,081,441. **Automatic Feeding Apparatus.** H. Willshaw and T. Norcross, both of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.  
 2,081,442. **Apparatus to Paint Golf Balls.** H. Willshaw, Wyld Green, S. N. Goodhall, Marsten Green, and W. A. Cowles, Sutton Coldfield, assignors to Dunlop Rubber Co., Ltd., London, all in England.  
 2,081,648. **Shoe Presser.** M. C. Suerken, assignor to Lamac Process Co., both of Erie, Pa.  
 2,081,670. **Vulcanizer.** A. Johnston, assignor to North British Rubber Co., Ltd., both of Edinburgh, Scotland.

### Dominion of Canada

- 365,957. **Apparatus to Make Rubber Thread.** T. L. Shepherd, London, England.  
 366,069. **Tire Tube Making Apparatus.** Wingfoot Corp., Wilmington, Del., assignee of B. C. Eberhard, Akron, O., both in the U. S. A.  
 366,070. **Tire Bead Wire Die Device.** Wingfoot Corp., Wilmington, Del., assignee of J. T. Gordon and R. W. Snyder, both of Akron, O., all in U. S. A.  
 366,111. **Rotary Shoe Sole Welding Press.** A. G. Siegfried, Kansas City, Mo., U. S. A.  
 366,170. **Article Assembling Conveyer Mechanism.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H.

- F. Lewis, Hamden, Conn., U. S. A.  
 366,184. **Tire Retreader.** Kite Mold Co., assignee of F. E. Kite and L. B. Broering, co-inventors, all of Los Angeles, Calif., U. S. A.  
 366,319. **Thread Production.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of J. Healey, Birmingham, England.  
 366,320. **Tire Cover Making Apparatus.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of J. B. A. Mazon Montluc, France.  
 366,397. **Molding Core.** C. B. Mathews, Ilkley, England.

### United Kingdom

- 456,377. **Device to Mold Plastic Substances.** British Celanese, Ltd., London.  
 456,540. **Knitters.** G. Blackburn & Sons, Ltd., Nottingham, and E. J. Towers, Ruddington.  
 456,638. **Pouch Vulcanizer.** P. M. Yeates, Toronto, Canada.  
 456,855. **Apparatus to Make Hydrochloride Sheets.** Wingfoot Corp., Wilmington, Del., U. S. A.  
 456,919. **Elastic Thread Knitter.** Wildt & Co., Ltd., and L. H. Leedham, both of Leicester.  
 457,201. **Vulcanizers.** J. O. Farrer, London, and E. A. J. Koch, Westminster.  
 457,208. **Tire Retreader.** J. W. Llewellyn, Sheffield.  
 457,689. **Apparatus to Make Rubber Threads.** W. W. Triggs, London. (Easthampton Rubber Thread Co., Easthampton, Mass., U. S. A.)  
 457,924. **Sifter.** C. Arnold, London. (W. S. Tyler Co., Cleveland, O., U. S. A.)  
 458,130. **Latex Dialysis.** Rubber Producers Research Association, H. P. Stevens, and J. W. W. Dyer, all in London.  
 458,625. **Core for Molding Hollow Articles.** C. B. Mathews, Ilkley, and J. G. Ambrose, Surrey.  
 458,673. **Boot and Shoe Machinery.** British United Shoe Machinery Co., Ltd., Leicester. (United Shoe Machinery Corp., Boston, Mass., U. S. A.)  
 458,676. **Conveyers.** W. Laurie, London.  
 458,859. **Boot Making Machines.** British United Shoe Machinery Co., Ltd., and G. Hazelton, Leicester.

### Germany

- 644,979. **Apparatus and Method for Producing Imitation Leather.** N. Schmitt, Gelsenkirchen.  
 645,271. **Device to Mount Elastic Tires, Etc.** Continental Gummiwerke A.G., Hannover.  
 645,302. **Vulcanizing Mold for Retreading Tires.** P. E. Hawkinson, Minneapolis, Minn., U. S. A. Represented by B. Kugelmann.  
 645,734. **Metal Molds for Tires, Tubes, Etc.** Continental Gummiwerke A.G., Hannover.

## PROCESS

### United States

- 2,078,243. **Weather Strip.** D. H. Harnly, Chicago, Ill.  
 2,078,406. **Filling Golf Ball Cores.** J. M. Oldham, assignor to L. A. Young, both of Detroit, Mich.  
 2,078,526. **Rubber Hydrochloride Films.** W. C. Calvert, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.  
 2,078,545. **Halogenation Products.** O. Schweitzer, Frankfurt a.M. Hochst, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt a.M., both in Germany.  
 2,078,678. **Elastic Transmission Ring.** J. M. Marti, Sabadell, Spain.  
 2,078,910 and 2,078,911. **Adhesion of Rubber.** J. A. Merrill, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.  
 2,078,917. **Attaching Rubber to Metal.** J. G. Malone, Detroit, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.  
 2,079,489. **Reclaiming Rubber.** R. M. Cole, Bryn Athyn, Pa.  
 2,079,584. **Sheet Material.** E. Hazell, New York, N. Y., H. C. Tingey, Nutley, and C. E. Linscott, Ridgewood, both in N. J., assignors to United States Rubber Products, Inc., New York, N. Y.  
 2,079,615. **Golf Ball Recoating.** M. F. Holt, Rye, and S. N. Lipowski, New York, both in N. Y., Lipowski assignor to Holt.  
 2,079,708. **Drying Sponges.** G. T. Hart, Jr., Lynn, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.  
 2,080,375. **Fibrous Compound of Thermoplastic Derivatives.** J. A. Merril, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.  
 2,080,910. **Removing Rubber from Materials Containing It.** K. W. Coons, Hamburg, assignor to National Aniline & Chemical Co., Inc., New York, both in N. Y.  
 2,080,948. **Bottle Stopper and Syringe.** L. J. Mazoyer, Baldwin, N. Y., and C. Jones, Red Bank, N. J., assignors to Whitall Tatum Co., New York, N. Y.  
 2,081,226. **Shoes.** A. Cocozella, Lynn, Mass.  
 2,081,246. **Container Closure.** C. E. McManus, assignor to Crown Cork & Seal Co., Inc., both in Baltimore, Md.  
 2,081,517. **Conducting Rubber.** H. A. M. Van Hoffen, assignor to Naamloze Vennootschap Hollandse Draad-en Kabelfabriek, both of Amsterdam, Netherlands.  
 2,081,759. **Flanged Head for Paper Containers.** G. A. Moore, assignor to Humoco Corp., both of Louisville, Ky.  
 2,081,777. **Hollow Rubber Articles.** J. A. Talalay, Bedford, England.



**Dominion of Canada**

- 365,907. **Baking Utensil.** K. Stuart, Neenah, Wis., and G. B. Linderman, Jr., Beverly, N. J., co-inventor.
- 365,944. **Permeable Imitation Leather.** T. Shiraishi, Hyogoken, Japan.
- 366,073. **Rubber Processing.** Wingfoot Corp., Wilmington, Del., assignee of J. A. Merrill, Akron, O., both in the U. S. A.
- 366,179. **Rubber Coated Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. W. Madge and S. D. Taylor, co-inventors, all of Birmingham, England.
- 366,259. **Waterproofing Textile Material.** G. Cogno, Torino, Italy.
- 366,305. **Perforated Corset Material.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. J. Sullivan, Fairfield, Conn., U. S. A.
- 366,306. **Perforated Corset Material.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. J. Dunn and H. D. McLean, co-inventors, both of Fairfield, Conn., U. S. A.
- 366,328. **Fibrous Product.** Johns-Manville Corp., New York, assignee of W. R. Seigle, Mamaroneck, both in N. Y., U. S. A.
- 366,375. **Floor Covering.** A. Elmen-dorf, Winnetka, Ill., U. S. A.

**United Kingdom**

- 456,053. **Marbleizing Rubber Surface.** British Thompson-Houston Co., Ltd., London.
- 456,117. **Felting Tennis Balls.** Continental Gummi-Werke, Akt.-Ges., Hannover, Germany.
- 456,554. **Sheets and Threads.** F. Muller, Milan, Italy.
- 456,757. **Distilling Rubber Materials.** E. W. Fawcett, Norwich, and Imperial Chemical Industries, Ltd., London.
- 457,203. **Molding Perforated Sheets.** A. Von Ledofsky and J. Grabec, both in Bratislava, Czechoslovakia.
- 457,341. **Waterproofing.** V. G. Mfg. Co., Ltd., and F. M. Van Gelderen, both in London.
- 457,455. **Concentrating Latex.** A. T. B. Kell, Kent.
- 457,463. **Molding Grinding Tools.** W. J. Tennant, London. (Carborundum Co., Niagara Falls, N. Y., U. S. A.)
- 458,120. **Chlorinated Rubber.** C. R. Barsby, Liverpool, and Imperial Chemical Industries, Ltd., London.
- 458,283. **Adjusting Trouser Waistband.** S. G. Simon, Leeds.
- 458,466. **Elastic Yarns.** United States Rubber Products, Inc., New York, N. Y., U. S. A.
- 458,495. **Cable Joints.** M. Sigmund, Lutín, Czechoslovakia.

**Germany**

- 644,863. **Rubber Footwear.** Romika Schuhfabrik Gusterath G.m.b.H., Gusterath.
- 645,513. **Producing Two-Ply Hose.** Dragerwerk Heinr. & Bernh. Drager, Lubeck.

**CHEMICAL****United States**

- 2,078,472. **Lubricant.** C. C. Towne, Poughkeepsie, assignor to Texas Co., New York, both in N. Y.

- 2,078,527 and 2,078,528. **Rubber Preservative.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
- 2,078,617. **Bonding Composition.** R. E. Spokes, Ann Arbor, Mich., assignor to American Brakeblok, Corp., New York, N. Y.
- 2,078,881. **Latex Lacquer.** W. M. Munzinger, Heidelberg-Rohrbach, Germany, assignor to Rohm & Haas Co., Philadelphia, Pa.
- 2,079,319 and 2,079,320. **Sealing Compound.** W. A. Kalber, Somerville, Mass.
- 2,079,350. **Stabilized Coloring Composition.** M. Jones, W. F. Smith, and A. Stewart, all of Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
- 2,079,756. **Acid Resisting Composition.** C. R. Barsby, Liverpool, and H. R. L. Streight, Runcorn, both in England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
- 2,079,951. **Paint Binder.** J. Rinse, Overreen, assignor to Naamlooze Vennootschap tot voortzetting der zaken van Pieter Schoen & Zoon, Zaandam, both of Netherlands.
- 2,081,556. **Latex Concentrate.** A. E. Petersen, Frankfurt a.M., and W. Gensecke, Gonzenheim, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt a.M., all in Germany.
- 2,081,613. **Rubber Preservative.** T. W. Bartram, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., St. Louis, Mo.

**Dominion of Canada**

- 365,877. **Bond-Treated Fillers.** Pure Calcium Products Co., assignee of J. W. Church and R. R. McClure, co-inventors, all of Painesville, O., U. S. A.
- 366,029. **Chemical Resistant Coating.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. H. Harkins, River Edge, N. J., U. S. A.
- 366,030. **Accelerators.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. H. Howland, Nutley, N. J., U. S. A.
- 366,031. **Accelerators.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. E. Messer, Cheshire, Conn., U. S. A.
- 366,032 and 366,033. **Accelerators.** Dominion Rubber Co., Ltd., Montreal; P. Q., assignee of P. J. Leaper, Nantucket, Conn., U. S. A.
- 366,034. **Rubber-to-Metal Adhesive.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of B. Johnson, Akron, O., U. S. A.
- 366,071. **Accelerators.** Wingfoot Corp., Wilmington, Del., assignee of A. M. Clifford, Stow, O., both of U. S. A.
- 366,072. **Rubber Hydrochloride Film.** Wingfoot Corp., Wilmington, Del., assignee of W. C. Calvert, Oak Park, Ill., both in U. S. A.
- 366,088. **Molding Composition.** J. H. Coffey, Rhos-on-Sea, North Wales.
- 366,159. **Synthetic Rubber.** E. I. du Pont de Nemours & Co., Inc., assignee of A. M. Collins, both of Wilmington, Del., U. S. A.
- 366,180. **Thickeners.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of P. Schidrowitz and J. W. Malden, co-inventors, both of London, England.

- 366,290. **Lubricants.** Texaco Development Corp., Wilmington, Del., assignee of C. C. Towne, Beacon, N. Y., both in the U. S. A.
- 366,304. **Chemical Product.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. M. Collins, Wilmington, Del., U. S. A.
- 366,311. **Chlorinated Rubber.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. D. Spencer, Widnes, England, and S. Steele, Niagara Falls, N. Y., U. S. A.
- 366,312. **Hydrogenated Rubber.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. G. Moore, Runcorn, England.
- 366,317 and 366,318. **Rubber-like Composition.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of V. J. Hanslick and W. V. Ridge, co-inventors, both of Providence, R. I., U. S. A.

**United Kingdom**

- 456,049. **Phosphate Plasticizers.** Celluloid Corp., Newark, N. J., U. S. A.
- 456,148. **Rubber Hydrohalide.** J. G. Moore, Runcorn, and Imperial Chemical Industries, Ltd., London.
- 456,149. **Rubber Hydrochloride.** J. P. Baxter, Widnes, and Imperial Chemical Industries, Ltd., London.
- 456,150. **Rubber Hydrochloride.** R. C. Cooper, Widnes, and Imperial Chemical Industries, Ltd., London.
- 456,252. **Purified Carbon Black.** Bayerische Stickstoff-Werke Akt.Ges., Berlin, Germany.
- 456,340. **Insulating Compound.** Okonite Co., Passaic, N. J., U. S. A.
- 456,351. **Impregnating Compound.** J. C. Patrick, Morrisville, Pa., U. S. A.
- 456,359. **Softeners.** A. Carpmal, London. (I. G. Farbenindustrie A.-G., Frankfurt a.M., Germany.)
- 456,435. **Leather Substitutes.** Wilson Leather Co., Milwaukee, Wis., U. S. A.
- 456,536. **Rubber Substitutes.** A. Carpmal, London. (I. G. Farbenindustrie A.-G., Frankfurt a.M., Germany.)
- 456,735 and 456,751. **Accelerators.** A. Carpmal, London. (I. G. Farbenindustrie A.-G., Frankfurt a.M., Germany.)
- 456,757. **Gutta Percha Resins.** E. W. Fawcett, Norwich, and Imperial Chemical Industries, Ltd., London.
- 456,829. **Chlorinated Rubber.** F. T. Walker, London, A. C. Hetherington, Farnham Common, and Imperial Chemical Industries, Ltd., London.
- 456,848. **Coating Composition.** A. H. Stevens, London. (Congoleum-Nairn, Inc., Kearny, N. J., U. S. A.)
- 456,894. **Accelerators.** Wingfoot Corp., Wilmington, Del., U. S. A.
- 456,934. **Softeners.** Standard Oil Development Co., Linden, N. J., U. S. A.
- 457,047. **Pigments.** A. G. Bloxam, London. (Soc. of Chemical Industry in Basle, Switzerland.)
- 457,285. **Accelerators.** Wingfoot Corp., Wilmington, Del., U. S. A.
- 457,310. **Rubber Compositions.** United States Rubber Products, Inc., New York, N. Y., U. S. A.
- 457,311. **Plasticizer.** United States Rubber Products, Inc., New York, N. Y., U. S. A.
- 457,437. **Accelerators.** Soc. Italiana Pirelli, Milan, Italy.
- 457,477. **Accelerators.** W. Baird and J. S. H. Davies, both of Manchester, and Imperial Chemical Industries, Ltd., London.

- 457,590. **Plastic Compositions.** Harle Freres & Cie, Eure, France.  
 457,781. **Rubber Solutions.** D. D. Pratt, Chemical Research Laboratory, Waddington.  
 457,895. **Insulating Composition.** British Thomson-Houston Co., Ltd., London.  
 457,937. **Textile Feed Roller Compound Composition.** R. W. Cutler, Boston, Mass., U. S. A.  
 458,094. **Age Resisters.** Rubber Service Laboratories Co., Akron, O., U. S. A.  
 458,154. **Sound Damping Medium.** Klangfilm Ges., Berlin, Germany.  
 458,305. **Thermoplastic Compositions.** E. R. Dillehay, Glen Ellyn, Ill., U. S. A.  
 458,355. **Rubber Dispersions.** P. Schindrowitz and J. W. Malden, London.  
 458,707. **Belt Dressing Compound.** H. V. Dyke, Auckland, New Zealand.  
 458,781. **Plastics.** A. Carpmal, London. (I. G. Farbenindustrie A.-G., Frankfurt a.M., Germany.)  
 458,814. **Moistureproof Coating.** E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., U. S. A.  
 458,816. **Protective Dispersions.** E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., U. S. A.  
 458,817. **Protective Emulsions.** E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., U. S. A.  
 458,818. **Insoluble Adhesives.** E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., U. S. A.  
 458,904. **Chlorinated Rubber Varnish.** Fabbriche Riunite Industria Gomma Torino W. Martiny Industria Gomma-Spiga-Sabit-Life and E. Zastrow, both of Turin, Italy.

### Germany

- 644,539. **Coloring High Molecular, Organic, Plastic Masses.** I. G. Farbenindustrie A.G., Frankfurt a.M.  
 644,729. **Molded Vulcanized Goods from Latex.** Vultex, Ltd., St. Heliers, Channel Islands. Represented by F. Daring and H. Boeters, Berlin.  
 645,201. **Polymerizing Chloride-2-Butadiene (1,3) in Aqueous Emulsion.** I. G. Farbenindustrie A.G., Frankfurt a.M.  
 645,260. **Separating Alban and Fluavil Resins from Gutta Percha by Solvent Extraction.** Electrical Research Products, Inc., New York, N. Y. Represented by B. Kugelmann, Berlin.  
 645,303. **Introducing Hydrophil Thickeners in Latex.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M., and T. R. Koehn-horn, Berlin.  
 645,355. **Chlorinated Rubber from Latex.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and J. McGavack, Leonia, N. J., U. S. A. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M., and T. R. Koehn-horn, Berlin.

### GENERAL United States

- 20,371. (Reissue.) **Ice Tray.** F. J. Leyner, Lafayette, O., assignor to A. Y. Dowell.  
 20,381. (Reissue.) **Rubber Heel Patching Lift.** A. L. Murray, Auburn, Ind.

- 2,078,311. **Heel.** R. H. Boag, Otahuhu, New Zealand.  
 2,078,354. **Abrasive Article.** D. E. Webster, assignor to Norton Co., both of Worcester, Mass.  
 2,078,382. **Ball.** G. H. Hanshaw, Beloit, Wis.  
 2,078,437. **Abrasive Wheel.** H. O. Anderson, assignor to Norton Co., both of Worcester, Mass.  
 2,078,444. **Shoe Protector.** F. Gamble, Los Angeles, Calif.  
 2,078,446. **Self-Sealing Box Blank.** A. M. Grigg, East Braintree, assignor of one-half to E. W. Parker, Dorchester, and one-sixth to A. A. Cruickshank, Milton, all in Mass.  
 2,078,512. **Colostomy Belt.** L. A. Simpson, Omaha, Nebr.  
 2,078,523. **Truss.** O. D. Arnsperger, Youngstown, O.  
 2,078,554. **Vehicle Elastic Wheel.** C. M. Arce, Buenos Aires, Argentina.  
 2,078,686. **Dilator and Medicator.** C. O. Rowe, Santa Monica, assignor of one-half to L. Janisky, Los Angeles, both in Calif.  
 2,078,707. **Shade.** F. W. Braunschweig, South Gate, Calif.  
 2,078,728. **Golf Club Rebound Check.** A. E. Lard, Washington, D. C.  
 2,078,904. **Cloth Shrinking Machine.** S. L. Cluett, assignor to Cluett, Peabody & Co., Inc., both of Troy, N. Y.  
 2,078,941. **Washing Machine.** A. Guignard, Hood River, Ore.  
 2,079,045. **Garment Retainer.** J. J. Schlaepfer, San Francisco, Calif.  
 2,079,331. **Sandal Overshoe.** B. R. Nyhagen, New York, N. Y.  
 2,079,346. **Antirattling Device.** H. Golden, assignor to Magna Products Corp., both of New York, N. Y.  
 2,079,457. **Blood Pressure Taking Device.** E. Laurisin, Youngstown, O.  
 2,079,598. **Hose.** R. Berkowitz, assignor to Metal Hose & Tubing Co., Inc., both of Brooklyn, N. Y.  
 2,079,738. **Stocking.** L. B. Herb, Wyomissing, assignor to Vanity Fair Silk Mills, Reading, both in Pa.  
 2,079,965. **Belt.** S. R. Reimel, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.  
 2,080,002. **Reinforced Rubber Article.** J. L. Bitter, Elizabethton, Tenn., assignor to North American Rayon Corp., New York, N. Y.  
 2,080,201. **Elastic Plug.** G. Donadon, M. Cardino, and A. Berio, all of Genoa, assignors to Soc. An. Salbe, Turin, all in Italy.  
 2,080,246. **Bather's Trunks.** F. J. Wengen, assignor to Eagle Knitting Mills, Inc., both of Milwaukee, Wis.  
 2,080,248. **Comb.** H. M. Ballou, North Attleboro, Mass.  
 2,080,469. **Pneumatic Foot Support.** L. L. Gilbert, Mountain Grove, Mo.  
 2,080,499. **Insole.** J. Nathansohn, Buffalo, N. Y., assignor to L. L. Gilbert, Michigan City, Ind.  
 2,080,601. **Bathtub.** F. Cappuccio, Oakland, Calif.  
 2,080,627. **Universal Joint.** B. T. Morgan, Kansas City, Mo.  
 2,080,642. **Racket.** A. M. Timpe, Los Angeles, Calif.  
 2,080,675. **Traction Device.** L. H. Sponseller, Goshen, Ind.  
 2,080,676. **Mouthpiece.** J. Stein, New York, and E. Freedman, Brooklyn.  
 2,080,886. **Upholstery Padding.** D. R. F. Fowler, Melrose Park, Pa.  
 2,080,989. **Vehicle.** S. Smith, Chobham, England.

- 2,081,237. **Propeller Shaft Center Bearing.** V. Jantsch, assignor, by mesne assignments, to Yellow Truck & Coach Mfg. Co., both of Pontiac, Mich.  
 2,081,290. **Child's Garment.** D. J. Bufington, Highland Park, Mich.  
 2,081,381. **Navigation Apparatus.** E. E. Oehmichen, Valentigney, France.  
 2,081,531. **Ball.** A. E. Fegan, assignor to George Young & Co., both of Chicago, Ill.  
 2,081,610. **Heel Construction.** H. Van Mourik, assignor to Van Mourik Associates, Inc., both in Detroit, Mich.  
 2,081,683. **Elastic Attaching Device.** A. Solosko, Chicago, Ill.  
 2,081,687. **Inflatable Swimming Suit.** Y. Temchin and H. Gross, both of New York, N. Y.

### Dominion of Canada

- 366,006. **Shoe Toe.** Safety Box Toe Co., Boston, Mass., U. S. A., assignee of Beckwith Box Toe, Ltd., Sherbrooke, P. Q., assignee of H. G. McMurray, Wakefield, and M. G. Norman, Beverly, co-inventors, both in Mass., U. S. A.  
 366,028. **Valve Assembly.** Dominion Oxygen Co., Ltd., Toronto, Ont., assignee of J. H. Buckman, Cranford, N. J., U. S. A.  
 366,169. **Tire.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. G. Havens, Detroit, Mich., U. S. A.  
 366,198. **Typewriter.** Underwood Elliott Fisher Co., New York, N. Y., assignee of W. A. Dobson, Wethersfield, Conn., both in the U. S. A.  
 366,251. **Ice Bag.** E. Pomeranz, San Clemente, Calif., U. S. A.  
 366,412. **Paste and Liquid Dispenser.** P. Serre, Paris, France.

### United Kingdom

- 457,013. **Conductor Current Supplier.** D. Sciaky, Paris, France.  
 457,028. **Yarns.** Everlastic, Ltd., and H. A. Raynor, both of Beeston.  
 457,072. **Batteries.** Batteries, Ltd., and M. Dybeck, both of Redditch.  
 457,098. **Pontoon Rafts.** L. Hammer, Vienna, Austria.  
 457,123. **Catheters.** W. Rusch, Rommelshausen, Germany.  
 457,140. **Yarns and Threads.** C. T. Pastor, Krefeld-Traar, Germany.  
 457,147 and 457,148. **Vehicles.** Daimler-Benz Akt.-Ges., Stuttgart, Germany.  
 457,154. **Tennis Ball Holders.** G. H. Webster, Ilford.  
 457,191. **Condensers.** Ideal Werke Akt.-Ges. fur Drahtlose Telephonie, Berlin, Germany.  
 457,246. **Shaft Couplings.** Simms Motor Units, Ltd., and W. Bryan, both of London.  
 457,267. **Spring Motors.** E. C. Brown and A. M. Henley, both in London.  
 457,288. **Hose.** Tuck & Co., Ltd., and E. W. R. Matthews, both of London.  
 457,314. **Tourniquets.** I. Zwirn, Berlin, Germany.  
 457,319. **Steering Axles.** Aston Martin, Ltd., and D. C. A. Bertelli, both in Middlesex.  
 457,428. **Door Bodies.** A. A. Thornton, London. (Donar Turen Werk Ges., Hamburg, Germany.)  
 457,464. **Tires.** B. P. Gray, Birmingham.  
 457,520. **Packages.** Wingfoot Corp., Wilmington, Del., U. S. A.  
 457,522. **Buffer and Positioning Device.**

S. Russell & Sons, Ltd., and E. G. Russell, both of Walsall.  
 457,530. **Running Boards and Mudguards.** Dunlop Rubber Co., Ltd., London, and S. Sadler, c/o Dunlop Rubber Co., Ltd., Birmingham.  
 457,533. **Tires.** B. P. Gray, Birmingham.  
 457,576. **Hinges.** United States Rubber Products, Inc., New York, N. Y., U. S. A.  
 457,580. **Hinges.** W. F. Herold and Bassick Co., both of Bridgeport, Conn., U. S. A.  
 457,586. **Annular Track Wheels for Vehicles.** Steyr-Daimler-Puch Atk.-Ges., Steyr, Austria.  
 457,606. **Expansion Joint.** K. Winkler, Casa Crocifisso, Switzerland.  
 457,620. **Gaiters.** E. H. P. M. Parsons, London.  
 457,641. **Window Frames.** General Motors Corp., Detroit, Mich., U. S. A. (Assignors of A. J. Fisher and E. G. Simpson, both of Detroit.)  
 457,663. **Respiratory Appliances.** P. Nicholson, Surrey.  
 457,703. **Hatches.** R. B. Reith, Newcastle on Tyne.  
 457,711. **Laminated Springs.** H. Reinz, Berlin, Germany.  
 457,722. **Woven Fabrics.** J. E. Pollak, London. (American Brakeblok Corp., Detroit, Mich., U. S. A.)  
 457,723. **Resilient Mountings.** Philco Radio & Television Corp., Philadelphia, Pa., U. S. A.  
 457,724. **Powder Blowers.** Stanco, Inc., Linden, N. J., U. S. A.  
 457,730. **Shock Absorbers.** P. Henss, Salzderhelden, Germany.  
 457,770. **Conductors.** Allgemeine Elektrizitäts-Ges., Berlin, Germany.  
 457,887. **Heel Pads.** A. Herpe, London. (M. Herpe, Paris, France.)  
 457,892. **Massaging and Spraying Devices.** B. G. Donald and Rowson, Drew & Clydesdale, Ltd., both of London.  
 458,021. **Corset Pads.** M. B. Bernow, London.  
 458,060. **Bonnet Fastenings.** Fiat Soc. Anon., Turin, Italy.  
 458,134. **Wire Coatings.** M. R. Moritz, Sale Moor, and Metropolitan-Vickers Electrical Co., Ltd., London.  
 458,155. **Bathing Caps.** W. W. Hafenden, London.  
 458,165. **Printing Surfaces.** A. D. Nightall, Bedford.  
 458,167. **Tires.** A. Lacomblez, Brussels, Belgium.  
 458,171. **Gas Masks.** J. Munie, Paris, France.  
 458,210. **Pipe Joints.** W. W. Triggs, London. (S. R. Dresser Mfg. Co., Bradford, Pa., U. S. A.)  
 458,215. **Gas Masks.** E. Bohm, Trnovany-Teplice, Czechoslovakia.  
 458,241. **Spring Suspensions.** Getefo Ges. fur Technischen Fortschritt, Berlin, Germany.  
 458,262. **Stuffing Box Substitutes.** W. Murray and C. Weston & Co., Ltd., both of London.  
 458,282. **Syringes.** J. Siegert, Dresden, Germany.  
 458,284. **Trusses.** E. F. Pease, Akron, O., U. S. A.  
 458,288. **Tins.** F. W. Hampshire & Co., Ltd., and E. J. Moseley, both of Derby.  
 458,297. **Arm Rests.** G. W. Strong, Parramatta, and A. C. Howard, c/o Howard Auto-Cultivators, Ltd., Northmead, both in Australia.

458,320. **Inflating Valves.** Dunlop Rubber Co., Ltd., London, and K. Byard, Birmingham.  
 458,329. **Bottle Capper.** G. E. King, London.  
 458,338. **Seams.** A. Scheitlin, Zurich, Switzerland.  
 458,353. **Spray Nozzles.** J. R. Buchanan and T. W. Watts, both in Manchester.  
 458,367. **Game Striking Appliances.** Dunlop Rubber Co., Ltd., London, and H. H. Smith, c/o Dunlop Rubber Co., Ltd., Essex.  
 458,373. **Abrasive Coated Sheets.** W. J. Tennant, London. (Carborundum Co., Niagara Falls, N. Y., U. S. A.)  
 458,408. **Excavators.** E. Doe, Essex.  
 458,422. **Buckle Fastenings.** W. F. Houghton, Arlington, Va., U. S. A.  
 458,425. **Marble Polisher.** Speed Surfactors, Ltd., London.  
 458,429. **Apparatus for Storing Gases.** Graviner Mfg. Co., Ltd., London, and H. M. Salmond, Hampshire.  
 458,465. **Elevators.** A. F. White, Toronto, Canada.  
 458,488. **Garters.** B. S. Boutagy, Cairo, Egypt.  
 458,512. **Golf Practising Appliances.** J. W. L. Webster, Liverpool.  
 458,530. **Universal Joints.** Hardy, Spicer & Co., Ltd., and W. E. Sparrow, both of Birmingham.  
 458,538. **Respiratory Appliances.** R. H. Davis, London.  
 458,541. **Tins.** H. Wyner and Rothman's, Ltd., both of London.  
 458,555. **Heels.** O. Brockman, Louisville, Ky., U. S. A.  
 458,577. **Reservoir Brushes.** W. Boulton, Ltd., and H. H. Hall, both of Stoke on Trent.  
 458,683. **Games Simulating Golf.** F. A. Mitchell, London.  
 458,685. **Fuel Tanks.** County Commercial Cars, Ltd., E. T. J. Tapp, both of Fleet.  
 458,704. **Undergarments.** P. H. Robbins, New York, N. Y., U. S. A.  
 458,706. **Ash Trays.** S. Lewis, New York, U. S. A.  
 458,708. **Concrete Drier.** K. P. Billner, New York, N. Y., U. S. A.  
 458,722. **Rocking Chairs.** M. Stam and A. Lorenz, both of Berlin, Germany.  
 458,727. **Pipe Couplings.** P. Linke, Berlin, Germany.  
 458,728. **Door Hinges.** M. Rieger, Berlin, Germany.  
 458,740. **Artificial Bait.** R. P. A. Boccchino, Paris, France.  
 458,756 and 458,758 and 458,759. **Wet Presses of Paper Making Machines.** W. H. Millspaugh, Sandusky, O., U. S. A.  
 458,743. **Valves.** H. Hejtman, Prague, Austria.  
 458,775. **Bed Pans.** E. M. Rock, London.  
 458,804. **Mats.** Nuway Mfg. Co., Ltd., and J. H. Wray, both of Coalport.  
 458,876. **Filters.** E. W. Barnett, Essex.  
 458,906. **Powder Sprinklers.** J. H. E. Francis, Thames Iron Works, London.  
 458,974. **Picture Frames.** E. Bugatti, Bas-Rhin, France.  
 458,983. **Trusses.** L. E. Beasley, London.  
 458,992. **Clamps.** T. H. Prosser & Sons, Ltd., and W. E. B. Jaffe, both of London.  
 458,999. **Hand Wheels.** W. W. Hamill, Essex.

## Germany

644,443. **Belt with Flexible Insert.** H. Kruger, Muhlhausen, Thuringia.  
 645,109. **Self-sealing Insert for Tires.** M. Ruger, Coburg.  
 645,110 and 645,315. **Heel with Air Chamber.** R. H. Boag, Otahuhu, Auckland, New Zealand. Represented by R. Linde, Berlin.

## TRADE MARKS

### United States

345,358. **Fleetway.** Rubber tires. United States Rubber Co., New York, N. Y.  
 345,409. **Arrows and the word "Hevaloid"** underneath. Belting and cables. Cela Holding S. A., Luxembourg.  
 345,435. **E-Z Putt.** Golf balls. Goldsmith Bros., New York, N. Y.  
 345,486. **"Balanced Bead Tire"** above representation of an arrow containing the word "Spur," arrow pointing to section of tire. Tires. Spur Rubber Co., Inc., Chicago, Ill.  
 345,558. **Elastic Shell.** Balls. J. De Beer & Son, Albany, N. Y.  
 345,612. **Flexi-floor.** Flooring materials. R. C. A. Rubber Co., Akron, O.  
 345,613. **Wall-flex.** Wainscoting. R. C. A. Rubber Co., Akron, O.  
 345,814. **Nature's Rival.** Corsets, girdles, etc. Venus Foundation Garments, Inc., doing business as Nature's Rival Co., Chicago, Ill.  
 345,826. **Sheneel-lastik.** Foundation garments and girdles. Franco Corset Co., New York, N. Y.  
 345,834. **Ngris.** Combs. E. Dominici, Turin, Italy.  
 345,890. **Octagon** containing the word "Siltex." Suspenders and garters. Knothe Bros. Co., Inc., New York, N. Y.  
 345,894. **Saksette.** Corsets. Lily of France Corset Co., Inc., New York, N. Y.

(Continued on page 90)

### British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for May, 1937:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom.....	6,591	430
United States.....	22,606	582
Continent of Europe...	12,042	523
British possessions...	2,768	32
Japan.....	4,673	22
Other countries.....	867	16

Totals ..... 49,547 1,605

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra .....	6,407	2,784
Dutch Borneo .....	3,342	702
Java and other Dutch islands.	381	10
Sarawak .....	759	..
British Borneo .....	244	19
Burma .....	397	11
Siam .....	1,360	634
French Indo-China .....	86	102
Other countries .....	100	12
Totals .....	13,076	4,274



# Ample Reclaim Capacity

FIRMS understood to be engaged in the production of reclaimed rubber were circularized by the Leather and Rubber Division with a questionnaire asking for reports, based on plant operations during 24 hours a day and six days a week, on their potential annual capacity as of October 1, 1936, and June 1, 1937, and (allowing for planned extensions) on January 1, 1938. Under reclaimed rubber, directions called for inclusion of all grades of reclaim, hard rubber dust, and shoddy, but not factory scrap reground by the same company.

Replies were received from 28 companies operating 33 reclaiming establishments and reporting a potential annual capacity for production of 203,600 long tons as of October 1, 1936; 220,600 long tons as of June 1, 1937; and 253,900 long tons as of January 1, 1938. Replies were also received from several firms who reported no reclaiming facilities; while a very few firms known as producers failed to report. It is estimated that the reported statistics were at least 97% complete for the industry.

Of the firms reporting capacity, 13 with a combined annual capacity of 56,560 long tons reported the same annual production capacity for each of the three dates. With few exceptions these firms were rubber manufacturers who reclaim principally for their own use. These firms accounted for 27.5% of the reported October, 1936, capacity, and 22.1% of the January, 1938, capacity.

A group consisting of the eight leading firms accounted for over 85% of the total reported capacity on each date (over 86% for January, 1938).

## Monthly Capacity on Various Dates

The monthly capacity as of October 1, 1936, amounted to 16,967 tons on the basis of reported figures, or raising this from the estimated 97% to the full 100%, the total industry capacity was then 17,492 tons. The production reported by the Rubber Manufacturers Association for September, 1936, was 12,959 long tons (estimated by the association as 100%), signifying operations then at only 74.1% of capacity.

The 100% monthly capacity calculated in the same way for June 1, 1937, would be 18,952 long tons. The highest monthly production recently reported by The Rubber Manufacturers Association, Inc., was 15,938 long tons for December, 1936, and 15,795 long tons for May, 1937, strikes having at times affected production of some part of the industry in interim months. The following table shows that these figures

**SPECIAL Circular No. 3645**, issued June 17, 1937, by E. G. Holt, acting chief, Leather and Rubber Division, United States Department of Commerce, as abstracted herewith, indicates that ample provision is being made to accommodate near future requirements for reclaimed rubber.

The reports from the special survey (estimated to be at least 97% complete for the industry) point to an annual potential capacity (raised to 100%) of 227,424 long tons as of June 1, 1937, and 261,753 long tons by January 1, 1938.

According to reclaim consumption statistics revised in June by the Rubber Manufacturers Association and published in this issue, the total consumption for 1936 was 141,486 long tons and for the first four months of 1937 was 60,236 long tons. In 1920 the largest consumption year of all time, the total consumption was 226,588 long tons.

The prorated annual consumption for 1937, based on 60,236 long tons for the first four months, should be 180,708 long tons. Therefore average operation by the reclaiming industry as a whole throughout 1937 at the rate of 80% of the June 1, 1937, potential capacity would care for the 1937 prorated consumption of 180,708 long tons and operation at the rate of 86% of the January 1, 1938, potential capacity would equal the peak consumption of 226,588 long tons in 1929.

represented a much higher rate of operations for the industry in May than last September.

	Pro- duction During Month (Tons)	Capacity End of Month (Tons)	Oper- ating Rate (%)
Sept., 1936 .....	12,959	17,492	74.1
May, 1937 .....	15,793	18,952	83.3

During May the industry was operating at a rate approaching practical capacity, judging from information received, and it therefore appears that practical capacity is somewhat lower than the potential capacity reported under the instructions in our questionnaire. This is particularly true, probably, in the case of the numerous firms which produce reclaimed rubber for their own use, but not for sale to other manufacturers.

The monthly capacity on January 1, 1938, similarly raised to the estimated 100%, would be 21,813 long tons, or an

annual capacity of 261,753 long tons. It needs to be borne in mind that the statistics compiled in this survey represent potential capacity, and that long-sustained operations at a rate much above 80% would be somewhat unusual. It should, however, be noted that reclaimers might operate on a seven-day week basis and thus have a somewhat higher potential capacity than that reported under the instructions in our questionnaire.

## Pertinent Addenda

The Rubber Manufacturers Association, Inc., reporting the monthly production of reclaimed rubber, estimates its statistics to be 100% complete. The total production so reported for 1936 was 150,571 long tons. This, we find, did not include reports from firms which accounted for 4.86% of the somewhat incomplete production capacity reported to us as of October 1, 1936. It was nevertheless well above the production estimated in the Department of Commerce survey of rubber consumption for 1936, where after allowing for reported consumption, exports, and inventory changes, the production was estimated at only 142,000 long tons. We mention these facts as relevant and perhaps worth consideration by those who use the data contained in this circular.

The quarterly reports issued by The Rubber Manufacturers Association, Inc., also contain less complete statistics on production of reclaimed rubber, and their completeness percentage is estimated by the association by comparison with their estimated 100% monthly statistics on the same subject. We find these quarterly statistics did not include reports from firms which accounted for 23.87% of the production capacity reported to us as of October 1, 1936; the association production statistics for the four quarters accounted for 79.5% of the total reported by them for the twelve months.

## United States Latex Imports

Year	Pounds	Value
1934 .....	29,276,134	\$3,633,253
1935 .....	30,358,748	3,782,222
1936 .....	44,469,504	6,659,899
1937		
Jan. ....	2,995,027	535,546
Feb. ....	4,418,474	775,202
Mar. ....	4,962,915	968,053
Apr. ....	3,658,560	724,757

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.



## COMPOUNDING INGREDIENTS

**DURING** June occurred an indication of a slight recession in business due to inventory and other seasonal conditions which may continue during the summer months. However this falling off appears to be less than for the same period in previous years. The demand for the year to date has been well ahead of that in the corresponding half of 1936.

**CARBON BLACK.** Stocks at the end of May were the lowest for many years, and indications are that they may be still lower at the end of June. But production is being materially increased, and in view of a possible let-up in the demand during the summer, inventories should be improved very soon. Most observers believe that production will exceed consumption for several months. Prices are firm with little likelihood of any change.

Gastex business is 50% above that of last year, with many orders ahead. It is expected that increased capacity

will be provided soon. Price is unchanged.

**FACTICE.** Prices remain the same as last month, with a small drop in the demand.

**LITHARGE.** During the early part of June the market emerged from a period of dullness following the heavy purchases during the closing days of the first quarter. The price has remained the same, but the foreign metal market has recently weakened and, it is questionable whether the lead market will continue with the stability that has been featured for some weeks past.

**LITHOPONE.** The demand has been active, but is now slowing up slightly. Prices advanced  $\frac{1}{8}$ ¢ per pound during the week ending June 19.

**RUBBER CHEMICALS.** The demand, which has been good is now showing the seasonal drop. Prices are unchanged.

**RUBBER COLORS.** Demand has been good. There has been no change in prices on greens.

**RUBBER SOLVENTS.** Tank wagon prices in New York, Philadelphia, and northern New Jersey increased  $\frac{1}{4}$ ¢ per gallon. Mid-continent prices remained the same. The demand was active.

**STEARIC ACID.** There was a fairly active market on contracts and transient orders, with the same prices as previously reported.

**TITANIUM PIGMENTS.** The demand has been substantially ahead of that in past years, and the seasonal decline appears less than formerly. Prices on some grades advanced  $\frac{1}{8}$ ¢ per pound.

**ZINC OXIDE.** The demand has been good. Prices on lead free oxides increased  $1\frac{1}{2}$ ¢ per pound and  $\frac{1}{2}$ ¢ on other grades. French process, lead free zinc oxides made from high-grade metal and carrying the Red Seal price may be included in mixed cars with other lead frees at the standard lead free price. This policy enables pooling of tonnages to get minimum cars and the carload price.

### New York Quotations

June 26, 1937

Prices Not Reported Will Be Supplied on Application

#### Abrasive

Pumicestone, powdered .....	lb.	\$0.03	/ \$0.03½
Rottenstone, domestic .....	lb.	.03	/ .03½
Silica, 15 .....	ton	38.00	

#### Accelerators, Inorganic

Lime, hydrated .....	ton	20.00	
Litharge (commercial) .....	lb.	.08½	

#### Accelerators, Organic

A-1 .....	lb.	.26	
A-5-10 .....	lb.	.34	
A-10 .....	lb.	.34	
A-11 .....	lb.	.57	
A-19 .....	lb.	.57	
A-32 .....	lb.	.72	
A-77 .....	lb.	.47	
Accelerator 49 .....	lb.	.42	
808 .....	lb.		
833 .....	lb.		
Acrin .....	lb.		
Aldehyde ammonia .....	lb.		
Altax .....	lb.		
B-J-F .....	lb.		
Beutene .....	lb.		
Butyl Zimate .....	lb.		
C-P-B .....	lb.		
Captax .....	lb.		
Crylene .....	lb.		
Paste .....	lb.		
D-B-A .....	lb.		
Di-Esterex .....	lb.		
Di-Esterex-N .....	lb.		
DOTG .....	lb.	.47	
D.O.T.T.U. ....	lb.		
DPG .....	lb.	.37	
El-Sixty .....	lb.	.57	
Ethylideneaniline .....	lb.		
Formaldehyde P.A.C. ....	lb.		
Formaldehydeaniline .....	lb.		
Formaldehyde-para-toluidine ..	lb.		
Guantal .....	lb.	.40	/ .50
Hepteen .....	lb.		
Base .....	lb.		
Hexamethylenetetramine .....	lb.		
Lead oleate, No. 999 .....	lb.	.13½	
Witco .....	lb.	.15	
Methylened anilide .....	lb.		
Monex .....	lb.		
Novex .....	lb.		
O. N. V. ....	lb.		
Ovac .....	lb.		
Pipisolene .....	lb.	1.75	
R-2 .....	lb.	1.65	
Flase .....	lb.	3.60	
R & H 50-D .....	lb.		
Safex .....	lb.		

Super-sulphur No. 1 .....	lb.		
No. 2 .....	lb.		
Tetrone A .....	lb.		
Thiocarbamilide .....	lb.		
Thionex .....	lb.		
Trimene .....	lb.		
Base .....	lb.		
Triphenyl guanidine (TPG) ..	lb.		
Tuads .....	lb.		
Ureka .....	lb.	\$0.65	
Blend B .....	lb.	.65	
C .....	lb.	.60	
Vulcanex .....	lb.		
Vulcanol .....	lb.		
Vulcone .....	lb.		
Z-B-X .....	lb.		
Z-88-P .....	lb.	.51	
Zenite .....	lb.		
A .....	lb.		
B .....	lb.		
Zimate .....	lb.		
ZML .....	lb.		

#### Activator

Barak .....	lb.		
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#### Age Resisters

AgeRite Alba .....	lb.		
Exel .....	lb.		
Gel .....	lb.		
Hipar .....	lb.		
HP .....	lb.		
Powder .....	lb.		
Resin .....	lb.		
D .....	lb.		
Syrup .....	lb.		
White .....	lb.		
Akroflex C .....	lb.		
Albasan .....	lb.		
Antox .....	lb.		
B-L-E .....	lb.		
B-X-A .....	lb.		
Copper Inhibitor X-872 .....	lb.		
Flectol B .....	lb.	.54	
H .....	lb.	.54	
White .....	lb.	1.00	
M-U-F .....	lb.		
Neozone (standard) .....	lb.		
A .....	lb.		
C .....	lb.		
D .....	lb.		
E .....	lb.		
Oxymone .....	lb.	.68	
Parazone .....	lb.		
Perflectol .....	lb.	.67	
Permalux .....	lb.		

Santoflex A .....	lb.		
Solux .....	lb.		
Thermoflex .....	lb.		
A .....	lb.		
V-G-B .....	lb.		

#### Alkalies

Caustic Soda, flake, colum-			
bia (400 lb. drums) 100 lbs	\$3.00	/ \$4.00	
liquid, 50% .....	100 lbs.	2.25	
solid (700 lb. drums) 100 lbs.	2.60	/ 3.00	

#### Antiscorch Materials

A-F-B .....	lb.		
Antiscorch T .....	lb.		
Cumar RH .....	lb.	.09	
Retarder B .....	lb.		
W .....	lb.		
T-J-B .....	lb.		
U.T.B. ....	lb.		

#### Antisun Materials

Heliozone .....	lb.		
Sunproof .....	lb.		

#### Brake Lining Saturant

B. R. T. No. 3 .....	lb.	.0165/	.0175
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#### Colors

##### BLACK

Lampblack (commercial) ..	lb.	.15	
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##### BLUE

Brilliant .....	lb.		
Prussian .....	lb.	.37½	
Toners .....	lb.	.08	/ 3.50

##### BROWN

Mapico .....	lb.	.13	
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##### GREEN

Brilliant .....	lb.		
Chrome, light .....	lb.		
medium .....	lb.		
oxide (freight allowed) ..	lb.	.21	
Dark .....	lb.		
Guignet's, Easton, Pa., bbls.	lb.	.70	
Light .....	lb.		
Toners .....	lb.	.85	/ 3.50

##### ORANGE

Lake .....	lb.		
Toners .....	lb.	.40	/ 1.60

##### ORCHID

Toners .....	lb.	1.50	/ 2.00
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##### PINK

Toners .....	lb.	1.50	/ 4.00
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**PURPLE**

Permanent .....lb. \$0.60 /\$2.00  
Toners .....lb.

**RED**

Antimony  
Crimson, 15/17% .....lb. .50  
R. M. P. No. 3 .....lb. .46  
Sulphur free .....lb. .48  
Golden 15/17% .....lb. .28  
7-A .....lb. .35  
Z-2 .....lb. .22  
Aristi .....lb. 1.75  
Cadmium, light (400 lbs. bbls.) .....lb. .75  
Chinese .....lb.  
Crimson .....lb.  
Mapico .....lb. .09 1/4  
Medium .....lb.  
Rub-er-Red, Easton, Pa., bbls. ....lb. .09 1/4  
Scarlet .....lb.  
Toners .....lb. .08 / 2.00

**WHITE**

Lithopone (bags) .....lb. .04 3/8 / .04 5/8  
Albalth Black Label-11 .....lb. .04 3/8 / .04 5/8  
Astrolith (5-ton lots) .....lb. .04 3/8 / .04 5/8  
Azolith .....lb. .04 3/8 / .04 5/8  
Cryptone-19 .....lb. .05 7/8 / .06 1/8  
CB-21 .....lb. .05 7/8 / .06 1/8  
ZS No. 20 .....lb. .09 / .09 1/4  
No. 86 .....lb. .09 / .09 1/4  
Sunolith (5-ton lots) .....lb. .04 3/8 / .04 5/8  
Ray-Bar .....lb.  
Ray-Cal .....lb.  
Rayox .....lb.  
Titanolith (5-ton lots) .....lb. .05 7/8 / .06 1/8  
Titanox-A (50-lb. bags) .....lb. .16 / .16 3/4  
B (50-lb. bags) .....lb. .05 7/8 / .06 1/8  
B-30 (50-lb. bags) .....lb. .05 7/8 / .06 1/8  
C (50-lb. bags) .....lb. .05 7/8 / .06 1/8  
Ti-Tone .....lb.  
Zinc Oxide  
Anaconda, Green Seal  
No. 333 .....lb. .08 / .08 1/2  
Lead Free No. 352 .....lb. .07 1/2 / .08  
No. 570 .....lb. .07 1/2 / .08  
No. 577 .....lb. .07 1/2 / .08  
Red Seal No. 222 .....lb. .07 1/2 / .08  
U.S.P. No. 777 (bbls.) .....lb. .09 1/4 / .09 3/4  
White Seal No. 555 .....lb. .08 1/2 / .09  
Azo ZZ-11 .....lb. .06 3/4 / .06 1/2  
44 .....lb. .06 3/4 / .06 1/2  
55 .....lb. .06 3/4 / .06 1/2  
66 .....lb. .06 3/4 / .06 1/2  
French Process, Florence  
White Seal-7 (bbls.) .....lb. .08 1/2 / .08 3/4  
Green Seal-8 .....lb. .08 / .08 1/4  
Red Seal-9 .....lb. .07 1/2 / .07 3/4  
Kadox, Black Label-15 .....lb. .06 1/2 / .06 3/4  
Blue Label-16 .....lb. .06 1/2 / .06 3/4  
Red Label-17 .....lb. .06 1/2 / .06 3/4  
No. 25 .....lb. .07 1/2 / .07 3/4  
Horse Head Special 3 .....lb. .06 1/4 / .06 1/2  
XX Red-4 .....lb. .06 1/4 / .06 1/2  
23 .....lb. .06 1/4 / .06 1/2  
72 .....lb. .06 1/4 / .06 1/2  
78 .....lb. .06 1/4 / .06 1/2  
80 .....lb. .06 1/4 / .06 1/2  
103 .....lb. .06 1/2 / .06 3/4  
110 .....lb. .06 1/2 / .06 3/4  
St. Joe (lead free)  
Black Label .....lb. .06 1/4 / .06 1/2  
Green Label .....lb. .06 1/4 / .06 1/2  
Red Label .....lb. .06 1/4 / .06 1/2  
U.S.P. X .....lb. .09 / .09 1/4  
White Jack .....lb. .09 / .09 1/4

**YELLOW**

Cadmolith (cadmium yellow), 400 lb. bbls. ....lb. .50  
Lemon .....lb.  
Mapico .....lb. .09 1/4  
Toners .....lb. 2.50

**Dispersing Agents**

Bardol .....lb. .0215 / .024  
Darvan .....lb.

**Factice**

Amberex .....lb. .23  
Brown .....lb. .09 / .15  
Neophax A .....lb. .14  
B .....lb. .13 1/4  
Fac-Cel B .....lb. .17  
C .....lb. .17  
White .....lb. .10 / .16 1/4

**Fillers, Inert**

Asbestine, c.l., f.o.b. mills .....ton 15.00  
Barytes .....ton 30.00 / 36.00  
f.o.b. St. Louis (50 lb. paper bags) .....ton 22.85 / 23.05  
off color, domestic .....ton 20.00 / 25.00  
white, imported .....ton 29.00 / 32.00  
Blanc fixe, dry, precip. ....lb. .03 1/2 / .05  
Calcene .....ton 37.50 / 45.00  
Infusorial earth .....lb. .02 / .03  
Kaite No. 1 .....ton  
No. 3 .....ton  
Magnesia, calcined, heavy .....lb. .04  
Carbonate L.C.L. ....lb. .07 / .09  
Pyrex .....ton

**Whiting**

Columbia Filler .....ton \$9.00 / \$14.00  
Domestic .....100 lbs.  
Guilfers .....100 lbs.  
Hakuenka .....lb.  
Paris white, English cliff stone .....100 lbs.  
Southwark Brand, Commercial .....100 lbs.  
All other grades .....100 lbs.  
Suprex, white extra light .....ton 45.40 / 60.00  
heavy .....ton 45.40 / 60.00  
Witco, c.l. ....ton 7.00

**Fillers for Pliability**

P-33 .....lb.  
Thermax .....lb.  
Velvetex .....lb. .03 / .04 1/4

**Finishes**

IVCO lacquer, clear .....gal. 2.15 / 2.50  
colors .....gal. 2.60 / 4.70  
Rubber lacquer, clear .....gal.  
colored .....gal.  
Starch, corn, pwd. ....100 lbs.  
potato .....lb.  
Taic .....ton 25.00 / 45.00

**Flock**

Cotton flock, dark .....lb. .12 1/4 / .14  
dyed .....lb. .50  
white .....lb. .14 1/2 / .20  
Rayon flock, colored .....lb. 1.25 / 1.60  
white .....lb. 1.10

**Latex Compounding Ingredients**

Accelerator 85 .....lb.  
89 .....lb.  
122 .....lb.  
552 .....lb.  
Alphasol-OS .....lb. .60  
Antox, Dispersed .....lb.  
Aquarex A .....lb.  
D .....lb.  
F .....lb.  
Areskap No. 50 .....lb. .20  
No. 100, dry .....lb. .43  
Aresket No. 240 .....lb. .18  
No. 250, alcoholic .....lb. .22  
No. 300, dry .....lb. .46  
Areskene No. 375 .....lb. .40  
No. 400, dry .....lb. .56  
Black No. 25, Dispersed .....lb. .22 / .40  
Cataipso .....ton  
Color Pastes, Dispersed .....lb.  
Disperx No. 15 .....gal. .80 / .95  
No. 20 .....gal. .60 / .75  
Emo, brown .....lb. .15  
white .....lb. .15  
Factice Compound, Dispersed .....lb. .40  
Heliozone, Dispersed .....lb.  
Igepon A .....lb.  
MICRONEX, Colloidal .....lb. .06 / .07  
Nekal BX (dry) .....lb.  
Palmol .....lb. .10  
Paradors .....lb.  
S.1 (400 lbs. drums) .....lb. .65  
Stablex A .....lb. .90 / 1.10  
B .....lb. .65 / .90  
C .....lb. .40 / .50  
Sulphur, Dispersed .....lb. .10 / .15  
No. 2 .....lb.  
T.1. (400 lb. drums) .....lb. .40  
Tepidone .....lb.  
Vulcan Colors .....lb.  
Zinc oxide, Colloidal .....lb.  
Dispersed .....lb. .09 / .15

**Mineral Rubber**

B. R. C. No. 20 .....lb. .009 / .01  
Black Diamond .....ton 25.00  
Genasco Hydrocarbon, granulated, (fact'y) .....ton  
solid .....ton  
Gilsonite Hydrocarbon (factory) .....ton  
Hydrocarbon, hard .....ton  
soft .....ton  
Parmr Grade 1 .....ton 25.00  
Grade 2 .....ton 25.00  
Pioneer .....ton 265°

**Mold Lubricants**

Lubrex .....lb.  
Mold Paste .....lb. .18  
Sericite .....ton 65.00 / 75.00  
Soapbark .....lb.  
Soapstone .....ton 25.00 / 35.00

**Oil Resistant**

AXF .....lb.

**Reclaiming Oils**

B. R. V. .....lb. .03 / .0325  
S. R. O. .....lb. .0175 / .0185

**Reinforcers**

Carbon Black  
Aerfloted Arrow Specification Black .....lb. .0535 / .0825  
Arrow Compact Granulized Carbon Black .....lb.  
"Certified" Heavy Compressed, Cabot .....lb.  
Spheron .....lb.

Continental Dustless .....lb. \$0.0445 / \$0.0535  
Compressed .....lb. .0445 / .0535  
Uncompressed .....lb. .0445 / .0535  
Disperso, c.l. ....lb. .0445 / .0535

Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Dixiedensed, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Excello, c.l., f.o.b. Gulf ports .....lb. .0445 / .0645  
delivered New York .....lb. .0535 / .0735  
l.c.l., delivered New York .....lb. .07 / .08 1/4  
Fumonex, c.l., f.o.b. works, ex-warehouse .....lb. .03  
Gastex .....lb. .04 1/2  
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. ....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
MICRONEX Beads, c.l., f.o.b. Gulf ports .....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Mark II, c.l., f.o.b. Gulf ports .....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Standard, c.l., f.o.b. Gulf ports .....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
W-5, c.l., f.o.b. Gulf ports .....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
W-6, c.l., f.o.b. Gulf ports .....lb. .0445  
c.l., delivered New York .....lb. .0535  
local stock, bags, delivered .....lb. .07 1/4  
Pelletex .....lb. .03 / .07  
Supreme, c.l., f.o.b. Gulf ports .....lb. .0445 / .0645  
delivered New York .....lb. .0535 / .0735  
l.c.l., delivered New York .....lb. .07 / .08 1/4  
"WYEX BLACK" .....lb.  
Carbonex .....lb. .029 / .0315  
Carbonex "S" .....lb. .0315 / .034  
Clays  
Aerfloted Paragon (bulk) .....ton 6.50  
Suprex No. 1 Selected .....ton 10.00  
No. 2 Standard .....ton 9.00  
China .....ton 17.50 / 20.00  
Dixie .....ton  
Junior .....ton  
McNamee .....ton  
Par .....ton  
Witco .....ton 9.00  
Cumar EX .....lb. .035

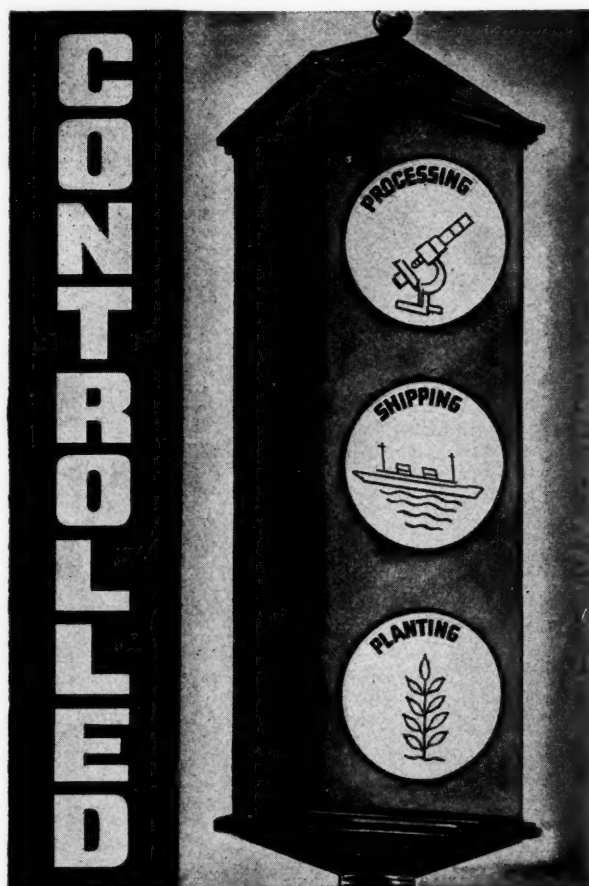
**Reodorants**

Amora A .....lb.  
B .....lb.  
C .....lb.  
D .....lb.  
Paradors .....lb.  
Rodo No. 0 .....lb.  
No. 10 .....lb.

**Rubber Substitutes**

Black .....lb. .07 3/4 / .13 1/4  
Brown .....lb. .08 1/2 / .14  
White .....lb. .09 1/2 / .15 1/4

(Continued on page 90)



## FOR YOUR PROTECTION!

**ABSOLUTE UNIFORMITY** is vital to the success of your products and the maintenance of your reputation! For *your* protection we assure the quality and uniformity of Latex by the rigid single company control of (1) Rubber Plantations; (2) Bulk shipments that minimize variation; (3) Scientific processing under continuous laboratory supervision. We carry stocks on hand . . . **NORMAL, CONCENTRATED, and PROCESSED**, for immediate delivery.

# LATEX

**NAUGATUCK CHEMICAL**

Division of United States

1790 Broadway



Rubber Products, Inc.

New York, N. Y.

## Regular and Special Constructions of COTTON FABRICS

Single Filling Double Filling  
and

**ARMY  
Ducks**

**HOSE and BELTING**

**Ducks**

**Drills**

Selected

**Osnaburgs**

**Curran & Barry**  
**320 BROADWAY**  
**NEW YORK**

## COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES						
Futures	May 1	May 29	June 5	June 12	June 19	
May .....	12.88	.....	.....	.....	.....	.....
June .....	12.89	12.75	12.69	11.93	.....	.....
July .....	12.91	12.80	12.74	11.98	11.94	.....
Sept. ....	12.75	12.76	12.72	12.00	11.98	.....
Dec. ....	12.65	12.71	12.67	12.00	11.99	.....
Mar. ....	12.69	12.80	12.76	12.05	12.05	.....
May .....	12.83	12.79	12.08	12.12	.....	.....

## New York Quotations

June 26, 1937

<b>Drills</b>	
38-inch 2.00-yard .....	yd. \$0.15 1/2
40-inch 3.47-yard .....	yd. .09 7/8
50-inch 1.52-yard .....	yd. .21 3/4
52-inch 1.85-yard .....	yd. .18 3/4
52-inch 1.90-yard .....	yd. .18
52-inch 2.50-yard .....	yd. .16 3/4
52-inch 2.50-yard .....	yd. .14 3/4
59-inch 1.85-yard .....	yd. .14 3/4
<b>Ducks</b>	
38-inch 2.00-yard D. F. ....	yd. .15 3/4 / 16
40-inch 1.45-yard S. F. ....	yd. .22 1/2
51 1/2-inch 1.35-yard D. F. ....	yd. .23
72-inch 1.05-yard D. F. ....	yd. .31 / 31 1/2
72-inch 17.21-ounce .....	lb. .35
<b>MECHANICALS</b>	
Hose and belting .....	lb. .30
<b>TENNIS</b>	
52-inch 1.35-yard .....	yd. .25
<b>Hollands</b>	
<b>GOLD SEAL AND EAGLE</b>	
20-inch No. 72 .....	yd. .11
30-inch No. 72 .....	yd. .20
40-inch No. 72 .....	yd. .22
<b>RED SEAL AND CARDINAL</b>	
20-inch .....	yd. .09 3/4
30-inch .....	yd. .18
40-inch .....	yd. .19 3/4
50-inch .....	yd. .27
<b>Osnaburgs</b>	
40-inch 2.34-yard .....	yd. .14
40-inch 2.48-yard .....	yd. .13 3/4
40-inch 2.56-yard .....	yd. .11 3/8
40-inch 3.00-yard .....	yd. .11
40-inch 7-ounce part waste .....	yd. .11
40-inch 10-ounce part waste .....	yd. .16
37-inch 2.42-yard .....	yd. .13 3/4
<b>Raincoat Fabrics</b>	
<b>COTTON</b>	
Bombazine 60 x 64 .....	yd. .10
Plaids 60 x 48 .....	yd. .11 3/4
Surface prints 60 x 64 .....	yd. .12 1/2
Print cloth, 38 1/2-inch, 60 x 64 .....	yd. .06 3/4
<b>SHEETINGS, 40-INCH</b>	
48 x 48, 2.50-yard .....	yd. .12
64 x 68, 3.15-yard .....	yd. .11 3/4
56 x 60, 3.60-yard .....	yd. .09 3/4
44 x 40, 4.25-yard .....	yd. .07 3/4
<b>SHEETINGS, 36-INCH</b>	
48 x 48, 5.00-yard .....	yd. .06 3/4
44 x 40, 6.15-yard .....	yd. .05 3/4
<b>Tire Fabrics</b>	
<b>BUILDER</b>	
17 1/2 ounce 60" 23/11 ply Karded peeler .....	lb. .36
<b>CHAFER</b>	
14 ounce 60" 20/8 ply Karded peeler .....	lb. .36
9 1/4 ounce 60" 10/2 ply Karded peeler .....	lb. .35 1/2
<b>CORD FABRICS</b>	
23/5/3 Karded peeler, 1 1/8" cotton .....	lb. .37
15/3/3 Karded peeler, 1 1/8" cotton .....	lb. .35
23/5/3 Karded peeler, 1 1/4" cotton .....	lb. .45 1/2
23/5/3 Combed Egyptian .....	lb. .55 1/2
<b>LENO BREAKER</b>	
8 1/4 ounce and 10 1/4 ounce 60" Karded peeler .....	lb. .38

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures during June and closing prices on May 1 and 29.

Spot middlings sold at 13.30¢ per pound on May 24 and with the exception of May 28, when the price again hit 13.30¢, it was considerably below up to June 19. The price held between 13.16¢ and 13.30¢ until June 7 when it dropped 0.45¢ to 12.79¢ and continued downward to 12.36¢ on June 14. Between June 14 and 19 the price ranged between 12.39¢ and 12.56¢, closing at 12.44¢ per pound.

Total sales at 13 southern markets during the past 20 days were 29,008 bales as compared with 108,738 for the same days in 1936. Average prices at 10 designated southern markets trailed the New York middlings prices at from 0.18 to 0.23¢ per pound except on June 3 when the differential was 0.31¢.

Trading was very slow during the month with low volume sales. Indications are strong for an excellent crop this year with a possibility of a 4,000,000 bale outturn.

On June 9 commissioners of agriculture from 11 of the 13 southern states unanimously approved among other resolutions, a resolution asking for the removal of 12¢ loan cotton from the market.

On June 14 it was announced that the Commodity Credit Corporation would release further amounts of loan cotton at unchanged terms up to midnight June 25 and thereafter would release no cotton prior to January except by payment of the full loan and carrying costs. The market has automatically shut off this source of supply since the average price in ten markets is about 12 1/4¢ and the minimum repayment to the government is 12 3/4¢ based on the ten markets.

## Fabrics

The cotton textile mills are moving into the mid-year vacation shut-downs that usually come the first part of July. Since the market is within 30 days of the beginning of the current cotton crop shipments, consumers are inclined to wait for possible price changes in the raw material market before placing contracts. It is expected that there

will be renewed activity in the market the middle of July. The recent slow demand has resulted in slightly lower prices in some instances.

## RECLAIMED RUBBER

DURING May production of reclaimed rubber is reported to have been 15,793 tons which more than equaled the consumption of 14,693 tons. While the stocks on hand on May 31 are put at 14,647 tons, or approximately one month's supply, plans are now being executed to provide what is expected to be an ample supply of reclaim to take care of future needs.

The annual production capacity of the reclaiming industry in the United States has been increased 8.4% from 209,904 long tons on October 1, 1936, to 227,424 on June 1, 1937, according to an announcement on June 17 by the Department of Commerce. The report also stated that the producing firms plan to provide by January 1, 1938, a capacity further extended by 15% to 261,750 long tons.

Since last October actual production has been stepped up very decidedly. Some plants are operating seven days per week, or at 116% of their capacity. Since strikes have been previously settled, production during June was at a peak. A reasonable inventory of reclaim should be established in the near future.

No change has been made in the price schedule.

## New York Quotations

June 26, 1937

Auto Tire	Sp. Grav.	¢ per Lb.
Black Select .....	1.16-1.18	6 1/2 / 6 3/4
Acid .....	1.18-1.22	7 1/2 / 7 3/4
<b>Shoe</b>		
Standard .....	1.56-1.60	7 1/2 / 7 3/4
<b>Tube</b>		
No. 1 Floating .....	1.00	19 / 19 1/2
Compounded .....	1.10-1.12	11 / 11 1/2
Red Tube .....	1.15-1.30	11 / 11 1/2
<b>Miscellaneous</b>		
Mechanical Blends .....	1.25-1.50	4 1/2 / 5
White .....	1.35-1.50	15 / 15 1/2

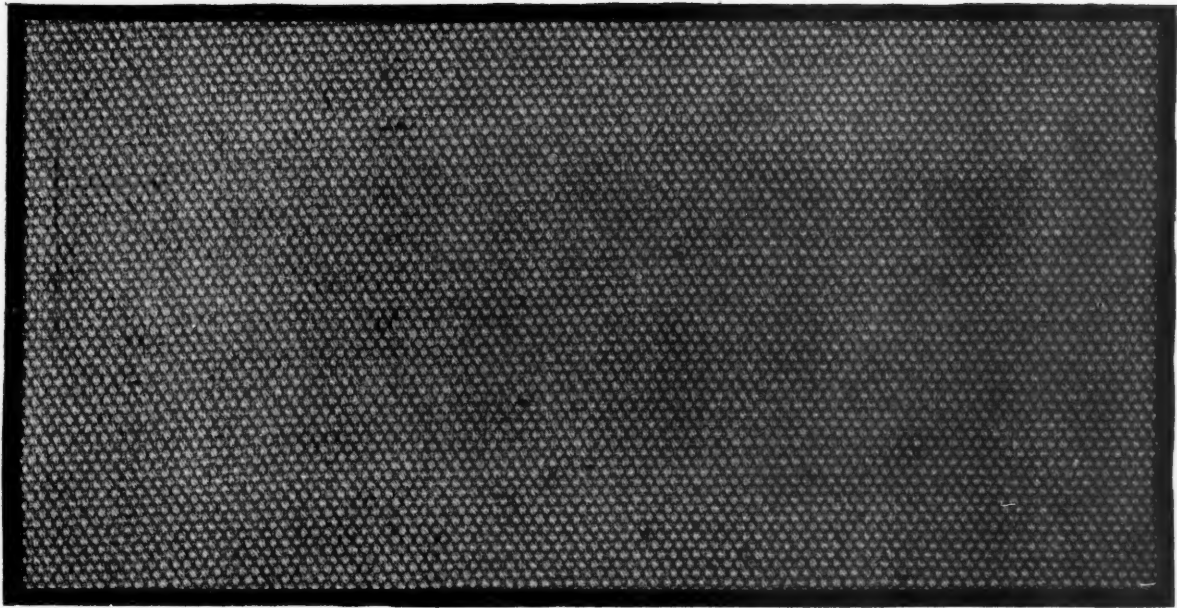
The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

## United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	% to Crude	U. S. Stocks*	Exports
1934	110,010	100,597	22.3	23,079	4,737
1935	122,140	113,530	22.9	25,069	5,383
1936	150,571	141,486	24.6	19,000	7,085
1937					
January .....	15,129	14,450	28.4	18,822	857
February .....	15,192	14,573	28.1	18,490	946
March .....	14,462	15,601	28.9	16,450	901
April .....	13,884	15,607	30.1	14,046	1,140
May .....	15,793	14,693	28.4	14,647	...

\*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage. Compiled by The Rubber Manufacturers Association, Inc.





SHAWMUT BELTING DUCK—B42-9

## *Special Belting Ducks* *to meet unusual specifications*

In addition to the unusual constructions of belting ducks, our engineers have been able to develop special ducks to meet particular or unusual specifications.

If you have need for belting duck of high tensile strength, special flexibility, or unusual relation between warp and filling strength, we would be glad to work with you to make it.

SHAWMUT MILL  
EXTRA  
BELTING DUCK

The accumulated knowledge of our engineering and mill departments and the facilities of the new Shawmut laboratories are at your service.

**WELLINGTON SEARS COMPANY**

65 WORTH STREET

NEW YORK CITY

## RUBBER SCRAP

### Scrap Rubber Price Trend—Ten Years

The following table shows the path of New York Bid prices in carlots delivered to eastern mills for headless standard mixed pneumatic auto tires from a maximum of \$37.00 per ton in January, 1928, to a minimum of \$10.00 in February and March, 1933, and up to \$23.50 in May, 1937.

	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
January ....	\$34.00	\$37.00	\$32.00	\$27.50	\$16.00	\$12.00	\$10.25	\$16.50	\$16.50	\$11.75	\$18.75
February ....	34.00	34.00	35.00	27.50	16.00	12.00	10.00	17.00	16.50	12.25	17.75
March ....	36.00	33.00	35.00	24.50	16.00	12.00	10.00	17.00	15.50	13.50	17.75
April ....	35.00	30.00	33.00	24.50	16.00	11.50	10.50	16.50	15.50	13.50	23.50
May ....	34.50	29.00	33.00	22.00	14.50	11.00	12.50	16.50	13.00	12.50	23.50
June ....	34.00	29.00	32.00	20.00	13.50	11.00	14.00	16.50	12.50	12.50	.....
July ....	31.50	29.00	32.50	19.00	13.00	10.50	17.50	16.00	11.75	12.50	.....
August ....	31.50	29.00	32.50	16.00	13.50	10.50	16.00	16.00	11.75	13.00	.....
September ..	30.50	28.50	32.50	15.50	13.00	11.25	16.00	16.00	11.75	13.00	.....
October ....	32.00	29.00	32.00	15.00	13.00	11.25	16.50	17.00	11.75	13.00	.....
November ..	33.00	32.00	30.00	16.00	12.50	10.50	16.50	16.50	11.75	15.00	.....
December ..	36.00	32.00	27.50	16.00	12.00	10.25	16.50	16.50	11.75	16.50	.....

Compilation of prices previously published monthly in INDIA RUBBER WORLD as of the 24th to 28th of each month.

## IMPORTS, CONSUMPTION, AND STOCKS

### United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

	U. S. Imports*	U. S. Consumption†	U. S. Stocks‡	U. S. Imports, Dealers, Etc.†	U. S. Stocks, Dealers, Etc.†	U. K.—Warehouses, London, and Penang	Singapore and Penang Public Dealers	World Production (Net Exports)†	World Consumption Estimated†	World Stocks‡
Twelve Months	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
1934 .....	469,484	453,223	355,000	47,644	134,927	62,142	1,019,200	921,141	735,391	643,170
1935 .....	448,116	491,544	303,000	39,094	164,295	28,304	872,800	937,489	643,170	643,170
1936 .....	490,858	575,000	223,000	56,567	78,462	26,969	855,923	1,043,550	455,409	455,409
1937 .....	570,499	646,777	230,167	63,597	108,215	26,761	81,756	91,269	450,560	436,657
January ...	31,292	48,631	296,683	43,870	162,107	31,195	62,726	85,192	569,826	569,826
February ..	35,219	36,841	293,631	46,532	157,028	38,421	64,019	71,083	572,323	572,323
March ....	37,451	42,813	284,561	58,935	147,712	29,322	69,252	80,250	590,475	590,475
April ....	40,370	52,031	277,478	47,678	140,404	32,200	60,030	85,041	527,178	527,178
May ....	35,598	50,612	262,415	48,860	130,590	26,687	68,838	90,624	501,582	501,582
June ....	41,835	52,772	245,544	47,228	122,285	28,260	66,478	88,544	532,992	532,992
July ....	35,880	48,250	235,850	60,343	113,386	29,493	83,850	86,581	490,074	490,074
August ....	42,562	46,777	230,167	63,597	108,215	28,289	71,213	81,699	468,238	468,238
September ..	48,386	46,449	233,336	62,240	103,962	26,936	72,314	82,341	490,602	490,602
October ....	40,920	49,637	224,000	67,825	96,625	24,593	81,756	91,269	450,560	450,560
November ..	44,296	50,433	211,480	73,691	88,781	26,761	78,355	88,010	436,657	436,657
December ..	57,049	49,753	223,000	56,567	78,462	26,969	77,092	92,513	455,409	455,409
1937 .....	570,499	646,777	230,167	63,597	108,215	26,761	81,756	91,269	450,560	436,657
January ...	32,820	50,818	204,201	55,096	71,062	36,365	71,583	90,846	412,404	412,404
February ..	43,289	51,887	195,080	53,538	63,760	42,132	70,575	91,049	398,369	398,369
March ....	52,039	54,064	191,928	56,994	52,077	42,485	102,099	104,953	437,539	437,539
April ....	35,850	51,797	174,934	72,530	48,748	38,812	89,820	96,507	390,914	390,914
May ....	50,840	51,733	172,985	58,542	.....	.....	.....	.....	.....	.....

\*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulating Committee. §Stocks at U. S. A., U. K., Singapore and Penang. Para, Manaos, and afoat. ¶Corrected to 100% from estimate of reported coverage. \*\*Not including additional absorption from U. K. manufacturers' stocks for any month during 1936. The figure will be included in yearly total.

**CRUDE** rubber consumption by manufacturers in the United States for May is estimated at 51,733 long tons, against 51,797 long tons for April, a decrease of less than 1% under April, but 2.2% above the 50,612 long tons consumed in May, 1936, according to R. M. A. statistics.

Gross imports of crude rubber for May totaled 50,840 long tons, an increase of 41.8% over the April figure

of 35,850 long tons and 42.8% over the 35,598 long tons imported in May, 1936.

Total domestic stocks of crude rubber on hand May 31 are estimated at 172,985 long tons, which compares with April 30 stocks of 174,934 long tons and 262,415 (revised) long tons on hand May 31, 1936.

Crude rubber afloat to United States ports as of May 31 is set at 58,542 long tons, compared with 72,530 long tons

### U. S. Crude and Waste Rubber Imports for 1937

	Plantations	Latex	Paras	Afri-cans	Cen-trals	Guay-Matto	Manicoba and Grosso	Totals	Ba-lata	Miscel-laneous	Waste
								1937	1936		
Jan. ....	30,674	1,171	625	167	23	160	..	32,820	31,292	13	383
Feb. ....	40,326	2,100	717	15	2	129	..	43,289	35,219	37	1,300
Mar. ....	48,367	2,117	1,285	47	11	212	..	52,039	37,451	21	894
Apr. ....	33,147	1,683	734	79	17	190	..	35,850	40,370	6	283
May ....	48,196	1,809	612	46	2	175	..	50,840	35,600	44	669
Total 5 mos., 1937 .....	200,710	8,880	3,973	354	55	866	..	214,838	.....	121	3,529
Total 5 mos., 1936 .....	170,342	6,062	2,438	573	139	373	..	179,927	.....	488	3,559

Compiled from The Rubber Manufacturers Association, Inc., statistics.

**THE** demand for all grades of rubber scrap was very active, with a record breaking consumption in June due to increased production of reclaimed rubber. The market has eased up somewhat with the crude rubber prices. No. 2 compound and red inner tubes declined ¼¢ per pound. Mixed auto tires dropped off \$1 per ton; clean mixed solid truck tires are approximately \$2 less per ton. Mechanical scrap dropped 2¢ per pound, and No. 2 red together with white druggists' sundries declined ¼¢ per pound. All others held the same price as shown in June.

Commerce Reports, dated May 29, 1937, stated that United States exports of scrap and old rubber are increasing. In March, 1937, a new high was reached, 6,199,644 pounds, value \$79,805. These exports for the first quarter of 1937 were 12,333,389 pounds, or 18% more than the 10,438,673 pounds for the corresponding period of 1936. By countries of destination, the United States exports of scrap and old rubber during the first three months of 1937 at the leading ten markets were: Hong-kong 2,527,961 pounds; Japan 2,183,299; Germany 1,893,825; China 1,434,243; Canada 1,113,336; France 738,643; United Kingdom 664,872; Argentina 470,094; Algeria 123,449; and Uruguay 90,504 pounds.

### CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

June 26, 1937

Boots and Shoes	Prices
Boots and shoes, black.....lb.	\$0.01¼ / \$0.01½
Colored .....	.007½ / .01
Untrimmed arctics .....	.01 / .01½
Inner Tubes	
No. 1, floating.....lb.	.14½ / .15
No. 2, compound.....lb.	.06¼ / .06¾
Red .....	.06¼ / .06¾
Mixed tubes .....	.06 / .06½
Tires (Akron District)	
Pneumatic Standard	
Mixed auto tires with	
beads .....	15.00 / 16.00
Beadless .....	22.50 / 23.00
Auto tire carcasses.....	30.00 / 33.00
Black auto peelings.....	24.00 / 26.00
Solid	
Clean mixed truck.....	32.00 / 33.00
Light gravity .....	42.00 / 45.00
Mechanicals	
Mixed black scrap .....	25.00 / 30.00
Hose, air brake.....	31.00 / 33.00
Garden, rubber covered.....	16.50 / 18.00
Steam and water, soft.....	16.50 / 18.00
No. 1 red.....lb.	.04¼ / .04½
No. 2 red.....lb.	.02¾ / .03
White druggists' sundries.....lb.	.04½ / .05
Mechanical .....	.02¼ / .03
Hard Rubber	
No. 1 hard rubber.....lb.	.15 / .17

afloat on April and 48,860 long tons afloat on May 31, 1936.

### London and Liverpool Stocks

Week Ended	Tons	
	London	Liverpool
June 5.....	21,566	23,925
June 12.....	12,924	22,640
June 19.....	21,670	21,983
June 26.....	21,840	21,563

# CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

## GENERAL RATES

Light face type \$1.00 per line (ten words)  
Bold face type \$1.25 per line (eight words)

Allow nine words for keyed address.

## SITUATIONS WANTED RATES

Light face type 40c per line (ten words)  
Bold face type 55c per line (eight words)

## SITUATIONS OPEN RATES

Light face type 75c per line (ten words)  
Bold face type \$1.00 per line (eight words)

Replies forwarded without charge.

### SITUATIONS WANTED

EXPERIENCED COMPOUNDER AND CHEMIST DESIRES POSITION in compounding, factory control, or development work. Ten years' experience, including wide variety of rubber products. Would also be interested in position as superintendent of small plant. Address Box No. 836, care of INDIA RUBBER WORLD.

TEN THOUSAND A YEAR EXECUTIVE SEEKING connection with reputable manufacturer molded rubber products. Innovator of many widely selling rubber products in United States and Mexico. Best connections buying executives. Will increase sales and develop items. Salary and commission desired. Address Box No. 839, care of INDIA RUBBER WORLD.

### SITUATIONS OPEN

WANTED: EXPERIENCED SALESMAN HAVING COMPLETE technical knowledge and experience in application of inerts, such as clays, whiting, mica, earth colors, etc., in paint, rubber, and allied industries. State fully experience and qualifications. Address Box No. 832, care of INDIA RUBBER WORLD.

CHEMIST WANTED: ONE WITH EXPERIENCE IN THE RUBBER industry, to take charge of laboratory and to experiment for rubberizing and combining manufacturer. One with latex and gutta percha experience preferred. Write, stating experience and salary to Box No. 837, care of INDIA RUBBER WORLD.

### POROTEX—New Treatment for Liners

#### ADVANTAGES OF POROTEX

1. All compounds stripped easily.
2. Wrinkles never cause liners to crack.
3. Liners do not rot as treatment renders them heat proof and oil proof.
4. Liners remain porous, reducing tendency to trap air.

#### POROTEX PRODUCTS

580 EAST 140th STREET

CLEVELAND, OHIO

### BARBER Genasco (M.R.) Hydrocarbon (SOLID OR GRANULATED)

A hard, stable compound—produced under the exacting supervision of an experienced and up-to-date laboratory. Aging tests have proved Genasco to be *always* of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Maurer, N. J. and Madison, Ill.

#### THE BARBER COMPANY, INC.

New York

Philadelphia

Madison, Ill.

Chicago

### SITUATIONS OPEN—Continued

IF YOU HAVE ONE OR TWO YEARS' EXPERIENCE in mechanicals, including sponge, and are interested in a technical position covering development and control that offers unusual opportunities, we want to hear from you. Our organization knows of this ad. Address Box No. 840, care of INDIA RUBBER WORLD.

### BUSINESS OPPORTUNITIES

SPLENDID SITE AT MALDEN, MASS., FOR RUBBER FACTORY, 36,000 feet adjoining railroad track. Unlimited free water privileges. Franklin P. Gowing, 43 Lincoln St., Boston, Mass.

NEED PERMANENT SPACE WITH STEAM, POWER, AND POSSIBLY milling facilities for our part-time band tube production. Address Box No. 833, care of INDIA RUBBER WORLD.

AVAILABLE ANY PART OF 6,000 SQUARE FEET WITH STEAM, milling, and power for economical operation. Industrial Products Co., Alliance, Ohio.

#### FOSTER D. SNELL, INC.

Chemists—Engineers

Every form of Chemical Service

305 Washington Street

Brooklyn, N. Y.

215 N. Calvert Street, Baltimore, Maryland

### INTERNATIONAL PULP CO.

41 Park Row, NEW YORK, N. Y.

SOLE PRODUCERS

### ASBESTINE

REG. U. S. PAT. OFF.

### Precipitated Surinam Balata

For golf ball manufacturers. Approximately 99% deresinated. Dependable deliveries. You also avoid fire or explosion hazard. Purer and cheaper than you can make it. Sample and price on request.

HUNTINGDON MANUFACTURING CO.  
MEADOWBROOK, PA.

## GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS, HYDRAULIC PRESSES, PUMPS,  
VULCANIZERS, TIRE MAKING EQUIPMENT, MOULDS, ETC.

### UNITED RUBBER MACHINERY EXCHANGE

319-323 FRELINGHUYSEN AVE.,

Cable Address "Urme"

NEWARK, N. J.



## BROCKTON TOOL COMPANY

103 Belmont Street

QUALITY MOULDS FOR ALL PURPOSES

Brockton, Mass.

THE FIRST STEP — A QUALITY MOULD

(Advertisements continued on page 91)



## New York Quotations

(Continued from page 84)

## Softeners

Burgundy pitch	lb.	\$0.06
Cyclone oil	gal.	.20
Palm oil (Witco)	lb.	.065
Pine tar	gal.	
Plastogen	lb.	
Reogen	lb.	
Rosin oil, compounded	gal.	.40
RPA No. 1	lb.	
No. 2	lb.	
Rubtack	lb.	.10
Tackol	lb.	.115
Powder	lb.	
Tonox	lb.	.16
Witco No. 20	gal.	.18

## Softeners for Hard Rubber Compounding

Resin C Pitch 55° C. M.P.	lb.	\$0.013 / \$0.014
Resin C Pitch 70° C. M.P.	lb.	.013 / .014
Resin C Pitch 85° C. M.P.	lb.	.013 / .014

## Solvents

Beta-Trichlorethane	gal.	
Bondogen	lb.	
Carbon bisulphide	lb.	
tetrachloride	lb.	

## Stabilizers for Cure

Laurex, ton lots	lb.	
Stearic B	lb.	.108 / .118
Beads	lb.	.108 / .118
Stearic acid, single pressed	lb.	.11 1/2
Stearite	100 lbs.	10.50 / 11.80
Zinc stearate	lb.	.23

## Synthetic Rubber

Neoprene Latex Type 50	lb.	
53	lb.	
54	lb.	
Type E	lb.	
"Thiokol" A (f.o.b. Yardville)	lb.	.35
Coating Materials	gal.	2.50 / 5.00
DX	lb.	0.55
Molding Powder	lb.	.50 / .75

## Tackifier

B. R. H. No. 2	lb.	.015 / .016
----------------	-----	-------------

## Varnish

Shoe	gal.	1.45
------	------	------

## Vulcanizing Ingredients

Sulphur	lb.	
Chloride, drums	lb.	.03 1/2 / .04
Rubber	100 lb.	2.00
Tellor	lb.	

Vandex .....lb.  
(See also Colors—Antimony)

## Waxes

Carnauba, No. 3 chalky	lb.	\$0.35 / \$0.36 1/2
2 N.C.	lb.	.40 / .41
3 N.C.	lb.	.37 1/2 / .38
1 Yellow	lb.	.46 1/2 / .47
2	lb.	.45 1/2 / .46
Montan, crude	lb.	.11 / .11 1/2

## Trade Marks

(Continued from page 80)

345,899. Representation of an eagle holding a flag. Tires. Goodyear Tire &amp; Rubber Co., Akron, O.

345,910. Sav-A-Thum. Thumb and finger protectors. Scotch Products, Inc., New York, N. Y.

345,968. Dent-I-saver. Chewing gum. W. W. Shenton, doing business as W. A. Shenton &amp; Co., Jersey City, N. J.

346,016. Smoke Test. Prophylactic articles. W. H. Reed, doing business as W. H. Reed &amp; Co., Atlanta, Ga.

346,160. Coreweld. Rubber covered rolls. Stowe-Woodward, Inc., Newton Upper Falls, Mass.

346,162. Representation of a flag. Transparent film for wrapping, etc. Goodyear Tire &amp; Rubber Co., Akron, O.

## Tire Production Statistics

## Pneumatic Casings—All Types

	In- ventory	Produc- tion	Total Shipments
1934	9,454,985	47,232,748	46,686,545
1935	8,195,863	49,361,781	50,183,129
1936	11,114,399	58,116,349	55,362,739
1937			
Jan.	11,377,015	4,980,174	4,509,240
Feb.	12,307,681	5,245,894	4,370,630
Mar.	12,448,167	5,915,575	5,787,051

## Inner Tubes—All Types

	1934	1935	1936
Jan.	9,179,893	46,227,807	45,045,495
Feb.	8,231,351	47,879,034	48,066,904
Mar.	10,985,273	57,247,554	54,624,321
1937			
Jan.	11,100,094	4,801,186	4,390,960
Feb.	11,733,525	5,090,504	4,536,354
Mar.	11,904,354	5,822,646	5,570,705

## Industrial Pneumatic and Solid Truck, Tractor, and Trailer Tires

	In- ventory	Produc- tion	Total Shipments
1934	16,397	197,497	187,152
1935	20,315	283,606	275,741
1936	32,694	389,240	385,164
1937			
Jan.	47,020	37,979	40,421
Feb.		42,716	40,924
Mar.		49,138	47,210

## Solid and Cushions for Highway Transportation

	In- ventory	Produc- tion	Total Shipments
1934	13,574		
1935	11,266		
1936	8,908		
1937			
Jan.	5,680	1,385	1,673
Feb.		1,507	1,472
Mar.		1,544	1,812

## Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires

	Cotton Fabric Pounds	Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1934	196,069,495	697,558,218	17,063,298,000
1935	202,318,119	756,773,779	18,167,352,000
1936	199,546,100	754,301,443	20,242,782,000
1937			
Jan.	17,987,663	66,728,092	1,415,232,000
Feb.	18,975,305	67,185,852	1,344,000,000
Mar.	21,499,363	77,363,656	1,703,562,000

Rubber Manufacturers Association, Inc., figures have been adjusted to represent 100% of the industry based on reports received which represent 97% for 1934-1935 and 81% for 1936-1937. \*Figures for years 1934, 1935, and 1936 included under Industrial Pneumatic and Solid Truck, Tractor, and Trailer Tires.

## Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo- China	Philippines and Oceania	Africa	South American	Mexican Guayule	Grand Total
1934	467,400	379,400	79,100	6,500	6,300	11,100	17,700	17,700	19,600	1,004,800	1,400	9,100	400	1,019,200
1935	417,000	282,900	54,300	9,100	4,900	8,900	19,500	28,300	28,700	853,600	1,500	5,000	500	872,800
1936	353,667	309,641	49,685	8,648	5,859	8,177	21,237	34,578	40,830	832,322	1,619*	6,122	1,462	855,923
1937														
Jan.	24,746	27,122	4,514	487	579	1,234	4,063	3,849	2,828	69,422	80	635	1,286	71,583
Feb.	24,138	26,770	5,603	1,033	843	790	2,043	3,554	3,089	67,863	180	537	1,789	70,575
Mar.	40,138	40,490	7,066	891	1,149	1,239	1,425	3,873	3,174	99,445	150*	500*	1,792	102,099
Apr.	41,696	33,175	3,423	644	600*	783	2,960	1,899	2,094	87,274	200*	600*	1,546	89,820

\*Estimate. Source: Statistical Bulletin of the International Rubber Regulation Committee.

## World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Czecho- slovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1934	439,100	158,500	9,600	9,100	28,400	11,000	50,400	59,300	21,400	69,900	47,300	60,500	964,500
1935	455,800	128,800	10,000	7,600	26,900	11,200	52,300	62,900	26,100	37,600	37,600	59,100	935,900
1936	475,361	—6,785	14,423	9,627	27,867	8,772	56,777	71,793	16,534	61,701	30,967	64,647	831,684
1937													
Jan.	33,260	4,573	1,260	760	1,758	767	6,770	5,545	2,299	4,357	467	5,521	67,337
Feb.	33,789	1,271	735	779	1,900	344	6,288	5,257	3,048	3,305	94	5,668	62,478
Mar.	33,743	1,227	819	1,033	1,809	410	4,342	4,568	718	5,172	4,376	5,833	61,596
Apr.	44,949	2,097	969	1,097	1,079	603	4,261	5,497	805	4,931	3,251	5,123	70,468
May	35,949	302	1,033	698	2,221	667	4,342	4,639	1,134	5,331	4,220	4,780	65,136
June	35,901	1,493	1,693	379	2,042	323	4,860	5,698	1,814	4,567	2,427	4,576	62,987
July	38,556	766	1,455	713	2,274	495	4,631	6,837	1,483	5,126	1,733	4,932	67,469
Aug.	41,094	1,581	762	789	3,780	989	4,522	6,556	1,421	4,305	3,128	4,659	70,424
Sept.	49,483	12	2,336	513	2,393	624	4,402	6,006	1,353	5,197	2,922	5,559	80,776
Oct.	40,301	87	1,124	817	3,110	1,026	4,423	7,232	767	6,602	2,761	5,909	73,985
Nov.	37,898	742	997	1,090	4,308	823	3,289	6,500	368	3,934	2,162	6,081	66,708
Dec.	50,838	4,926	1,220	759	1,193	1,701	4,647	7,458	1,324	8,674	3,426	6,096	82,320
1937													
Jan.	42,655	242	590	854	1,632	567	4,701	7,041	1,770	8,298	2,633	5,959	76,458
Feb.	44,398	222	331	1,363	1,271	837	5,276	7,911	1,502	6,605	3,048	5,071	77,391
Mar.	39,888	343	1,293	1,641	2,612	601	5,359	7,668	2,119	6,914	5,000*	6,157	79,595

\*Estimate. Source: Statistical Bulletin of the International Rubber Regulation Committee.

## Classified Advertisements

Continued

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FOR SALE: EQUIPMENT STILL SET UP IN PLANT AS WHEN last used. Attractively priced! East Liverpool, Ohio. 2 Watson-Stillman 3,000 lb. steam driven hydraulic pumps; Watson-Stillman air accumulator; Watson-Stillman 12-inch hydraulic press; 2 Devine No. 11 vacuum shelf driers. Send for complete list. STEIN-BRILL CORPORATION, 183 Varick St., New York, N. Y.

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Adams, Arch and Union Streets, AKRON, O.

European Office and Representative—Mr. Andre Berjonneau, #33 Blvd. des Batignolles, 33, Paris (VIII) France

# Distributors' Tire Stocks

In United States, April 1, 1937<sup>1</sup>

**T**IRE stocks in the United States were greater on April 1, 1937, than on April 1, 1936, according to questionnaires received: individual dealers had 7% more casings and 4.9% more inner tubes, and mass distributors had 20.9% more casings and 16.2% more inner tubes on April 1, 1937, than on April 1, 1936.

Comparisons are made in the following table of stocks of casings and inner tubes held by individual dealers and mass distributors in the last three surveys (April 1, 1936, October 1, 1936, and April 1, 1937), on an index number basis, the April 1, 1936, survey being considered as 100.

INDEX NUMBERS FOR STOCKS ON HAND

	Individual Dealers		Mass Distributors*	
	Casings	Tubes	Casings	Tubes
April 1, 1936 .....	100.0	100.0	100.0	100.0
October 1, 1936 .....	87.9	90.0	112.8	118.0
April 1, 1937 .....	107.0	104.9	120.9	116.2

\*Identical reports compared in these surveys.

## Individual Dealers' Stocks

The survey of tire stocks in hands of dealers shows the following comparable statistics as of April 1, for stocks held by retailers in 1937 as against 1936. The average number of automobile casings per dealer was 76.9 on April 1, 1937, compared with 71.9 on April 1, 1936.

DEALERS' STOCKS OF AUTOMOBILE TIRES

	April 1, 1936			April 1, 1937		
	No.	No. of Dealers	Average per Dealer	No.	No. of Dealers	Average per Dealer
Total Casings .....	813,359	11,313	71.9	959,432	12,480	76.9
Inner Tubes .....	1,018,512	11,526	88.4	1,179,498	12,728	92.7
Solids and Cushions ..	7,913	278	28.5	11,232	317	35.4

An analysis by volume groups has been prepared of the reports from dealers having stocks of casings, and a comparison made to the survey of April 1, 1936.

DEALERS CLASSIFIED BY VOLUME OF STOCKS

	April 1, 1936			April 1, 1937		
	No. of Dealers	% of Total Dealers	No. of Casings	No. of Dealers	% of Total Dealers	No. of Casings
Less than 10 .....	2,372	20.96	11,880	2,552	20.45	12,725
10 — 24 .....	3,235	28.60	52,068	3,605	28.89	57,459
25 — 49 .....	2,438	21.55	85,837	2,685	21.51	93,440
50 — 99 .....	1,651	14.59	113,318	1,774	14.21	122,798
100 — 199 .....	896	7.92	121,901	1,009	8.09	137,601
200 — 299 .....	302	2.67	71,865	324	2.59	77,724
300 — 399 .....	137	1.21	46,517	186	1.49	63,111
400 — 999 .....	211	1.87	126,546	242	1.94	145,124
1,000 and over .....	71	0.63	183,427	103	0.83	249,450
	11,313	100.00	813,359	12,480	100.00	959,432

The following table compares average stocks per dealer reporting each item on April 1st in the years 1928 to 1936, inclusive.

	AVERAGE STOCKS PER DEALER ON APRIL 1									
	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Total Casings ..	81.2	94.4	83.0	78.4	66.2	64.8	79.7	68.2	71.9	76.9
Balloon Casings ..	45.7	69.1	a	a	a	a	a	a	a	a
High Pressure Casings ..	a	a	22.4	15.6	12.1	11.3	13.0	10.6	a	a
Inner Tubes ..	123.4	143.5	118.6	106.5	90.7	82.6	104.7	87.9	88.4	92.7
Solids, Etc. ...	27.0	35.0	28.4	21.8	17.8	18.5	26.9	33.2	28.5	35.4

a Question not tabulated separately.

Since 1930 the percentages of dealers handling one, two, three, and four makes of tires have not changed materially.

NUMBER OF MAKES HANDLED BY DEALERS  
(Percentages of Total)

No. of Makes:	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
One .....	47.9	54.2	58.5	68.3	70.0	71.5	70.8	69.7	69.0	69.0	70.6
Two .....	37.5	33.0	30.7	24.9	24.0	23.6	24.0	24.3	25.0	24.2	23.0
Three .....	10.3	9.0	7.3	4.7	4.1	3.6	3.9	4.4	4.3	4.6	4.3
Four, Five											
Six .....	4.3	3.8	3.5	2.1	1.9	1.3	1.3	1.6	1.7	2.2	2.1
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

A tabulation was prepared from reports of individual dealers concerning facilities for vulcanizing and retreading tires for passenger cars and tires for trucks, with the following results:

NUMBER OF DEALERS OFFERING SPECIAL SERVICES

Volume of Stocks	No. of Dealers Reporting	Passenger Car		Truck	
		Vulcanizing Equipment	Retreading Equipment	Vulcanizing Equipment	Retreading Equipment
Under 100 .....	10,616	716	211	380	150
100 — 199 .....	1,009	177	53	129	38
200 — 299 .....	324	96	96	39	78
300 — 499 .....	269	121	39	101	32
500 — 999 .....	159	77	34	64	33
1,000 and Over ..	103	53	30	41	27
Total .....	12,480	1,240	463	754	358
% of Total .....	100.0	9.9	3.7	6.0	2.8

## Mass Distributors' Stocks

Identical reports received in the last three surveys were used in the calculation of index numbers for stocks of mass distributors, which were broken down into two general classes: (1) oil companies and (2) company-owned stores and chain stores. Stocks held by more than 45,000 outlets are embraced in this section and are given below in index numbers to show the trend of such stocks without revealing data submitted by any individual reporter.

INDEX NUMBERS

	No. of Outlets	No. of Casings	No. of Inner Tubes
Oil Companies			
April 1, 1936 .....	100.0	100.0	100.0
October 1, 1936 .....	109.1	113.9	99.3
April 1, 1937 .....	101.8	120.0	98.8
Company-owned Stores and Chain Stores			
April 1, 1936 .....	100.0	100.0	100.0
October 1, 1936 .....	103.0	111.6	154.8
April 1, 1937 .....	101.9	122.0	150.6
Total Mass Distributors			
April 1, 1936 .....	100.0	100.0	100.0
October 1, 1936 .....	108.8	112.8	118.0
April 1, 1937 .....	101.8	120.9	116.2

Total stocks reported by mass distributors, some of which are not included in the above tabulation by index numbers owing to failure to report in all three surveys, on April 1, 1937, follow:

MASS DISTRIBUTORS REPORTED STOCKS ON APRIL 1, 1937

	Automobile Casings	Inner Tubes
	No.	No.
Oil Companies .....	1,158,437	1,263,584
Company-owned Stores and Chain Stores ..	1,714,272	1,614,279
	2,872,709	2,877,863

<sup>1</sup>Special Circular No. 3641. United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Leather and Rubber Division, Washington, D. C. This survey was made with the support of The Rubber Manufacturers Association, Inc., and it covers the results of questionnaires received from both individual dealers and mass distributors.



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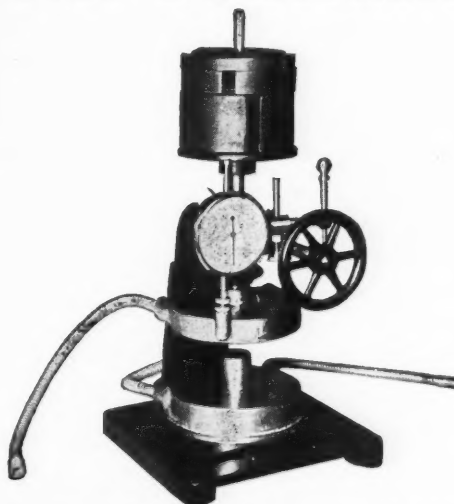
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temperature oven is required.

Illustration shows plain spindle type for loads up to 20  
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## Dominion of Canada Statistics

## Imports of Crude and Manufactured Rubber

	March, 1937		Twelve Months Ended March, 1937	
	Pounds	Value	Pounds	Value
<b>UNMANUFACTURED</b>				
Crude rubber, etc.	5,851,745	\$1,185,486	62,529,499	\$10,302,433
Gutta percha	3,619	2,221	16,560	8,235
Rubber, recovered	1,696,100	72,598	11,756,600	516,854
Rubber, powdered, and gutta percha scrap	709,100	15,718	4,066,500	68,108
Balata	1,717	1,043	16,813	5,311
Rubber substitute	68,300	16,279	499,800	135,100
Totals	8,330,581	\$1,293,345	78,885,772	\$11,036,041
<b>PARTLY MANUFACTURED</b>				
Hard rubber comb blanks		\$3,570		\$6,564
Hard rubber	3,490	1,992	62,779	39,742
Hard rubber tubes		389		3,956
Rubber thread not covered	631	742	49,772	32,989
Totals	4,121	\$6,693	112,551	\$83,251
<b>MANUFACTURED</b>				
Belting		\$12,429		\$93,733
Hose		11,004		84,635
Packing		8,257		62,933
Boots and shoes, pairs	44,695	12,370	156,194	65,952
Canvas shoes with rubber soles, pairs	5,849	2,085	116,496	41,754
Clothing, including water-proofed		3,373		25,446
Raincoats, number	1,627	5,328	12,551	42,921
Gloves, dozen pairs	179	710	3,321	8,672
Hot water bottles		1,155		19,876
Liquid rubber compound		12,099		36,940
Tires, bicycle, number	17,257	7,039	83,059	33,039
Pneumatic, number	1,968	20,627	16,069	177,611
Inner tubes, number	457	1,104	4,596	9,733
Solid for automobiles and motor trucks, number	23	1,443	272	11,801
Other solid tires		1,882		9,687
Mats and matting		6,078		72,091
Cement		12,099		68,566
Golf balls, dozens	1,894	3,617	30,387	75,850
Heels, pairs	3,887	381	65,403	4,107
Other rubber manufactures		125,732		1,219,653
Totals		\$248,812		\$2,165,000
Totals, rubber imports		\$1,548,850		\$13,284,292

## Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
<b>UNMANUFACTURED</b>				
Waste rubber	\$4,616		\$107,632	
<b>MANUFACTURED</b>				
Belting	\$77,389		\$586,829	
Canvas shoes with rubber soles	141,368		994,274	
Boots and shoes	303,741		3,589,091	
Clothing, including water-proofed	47,977		295,911	
Heels	17,459		184,382	
Hose	22,840		209,951	
Soles	22,939		186,017	
Tires, pneumatic	1,058,154		7,091,311	
Not otherwise provided for	40		305	
Inner tubes	86,593		621,669	
Other rubber manufactures	81,101	\$1,225	646,421	\$24,750
Totals	\$1,859,601	\$1,225	\$14,406,161	\$24,750
Totals, rubber exports	\$1,864,217	\$1,225	\$14,513,793	\$24,750

## Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2312	Supplier of a rubber composition suitable for setting Dutch kalsomine and floor brushes.
2313	Manufacturer of rubber covered steel wire.
2314	Supplier of latex in New Jersey.
2315	Supplier of cloth impregnated with latex.
2316	Information wanted on roughening or pebbling the surface of rubber articles.
2317	Manufacturer of rubber machinery, especially for making toy balloons and heels.
2318	Supplier of vulcanized bitumen.
2319	Manufacturer of Anchor Rubber Maid bath tub mat.
2320	Manufacturer of machine for twisting tire cord fabric.

## Rubber Questionnaire

## First Quarter, 1937\*

	Long Tons			
	Inventory at End of Quarter	Production	Shipments	Consumption
<b>RECLAIMED RUBBER</b>				
Reclaimers solely (6)	2,159	22,418	22,031	
Manufacturers who also reclaim (16)	4,465	14,765	4,921	13,785
Other manufacturers (110)	6,003			17,148
Totals	12,627	37,183	26,952	30,933
<b>SCRAP RUBBER</b>				
Reclaimers solely (6)	26,261	24,277		12,807
Manufacturers who also reclaim (15)	23,032	18,121		11,490
Other manufacturers (13)	143			
Totals	49,436	42,398		24,297

## Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

Value of Shipments		Total Sales Value of Shipments of Manufactured Rubber Products
Products	Rubber Consumed Long Tons	
Tires and Tire Sundries		
All types pneumatic casings (except bicycle, airplane).....	82,880	\$85,438,000
All types pneumatic tubes (except bicycle, airplane).....	11,870	10,381,000
Bicycle tires, including juvenile pneumatics (single tubes, casings, and tubes).....	961	1,006,000
Airplane tires and tubes.....	58	164,000
Solid and cushion tires for highway transportation.....	91	200,000
All other solid and cushion tires.....	201	472,000
Tire sundries and repair materials.....	1,706	2,339,000
Totals .....	97,767	\$100,000,000
Other Rubber Products		
Mechanical rubber goods.....	13,798	\$36,057,000
Boots and shoes .....	5,754	11,308,000
Insulated wire and cable compounds.....	2,258	↑
Druggists' sundries, medical and surgical rubber goods.....	1,090	2,550,000
Stationers' rubber goods.....	545	713,000
Bathing apparel.....	276	389,000
Miscellaneous rubber sundries.....	848	1,627,000
Rubber clothing.....	129	604,000
Automobile fabrics.....	108	644,000
Other rubberized fabrics.....	1,399	3,740,000
Hard rubber goods.....	639	2,146,000
Heels and soles.....	3,227	5,431,000
Rubber flooring.....	288	516,000
Sponge rubber.....	1,182	1,617,000
Sporting goods, toys, and novelties.....	635	1,560,000
Totals .....	32,176	\$68,902,000
Grand totals—all products.....	129,943	\$168,902,000

## Inventory of Rubber in the United States and Afloat

	Long Tons	
	Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	84,386	8,052
Importers and dealers	47,612	44,568
Totals	131,998	52,620

\*Number of rubber manufacturers that reported data was 188; crude rubber importers and dealers, 46; reclaimers (solely), 6; total daily average number of employees on basis of third week of January was 146,366.

It is estimated that the reported grand total crude rubber consumption is 82.9%; grand total sales value, 80%; the grand total crude rubber inventory, 68.8%; afloat figures, unavailable; the reclaimed rubber production 83.0%; reclaimed consumption, 69.3%; and reclaimed inventory, 76.8% of the total of the entire industry.

†Owing to the difficulty of securing representative sales figures this item has been discontinued.

Compiled from statistics supplied by The Rubber Manufacturers Association, Inc.

No.	INQUIRY
2321	Supplier of liquid latex known as "Isenota."
2322	Supplier of soft rubber sheet for engraved printing plates.
2323	Manufacturer of rubber heel trimmers.
2324	Manufacturer of "Kink-Proof" or "Twist-Proof" or "Notwist" rubber spiral telephone cords.
2325	Information wanted on uses of new unvulcanized scrap.
2326	Who sprays rayon and rubber.
2327	Supplier of latex coated or impregnated papers on paper board.
2328	Manufacturer of sponge rubber pads for riding saddles.
2329	Manufacturer of orthopedic half heels for nailing on shoes.
2240	Supplier of rubber compound that can be poured into a mold and not require vulcanizing.
2241	Supplier of cadmium sulphide.
2242	Information wanted on hydrochlorinated rubber.

Reg. U. S. Pat. Office

# ROTO-FLEX BALL

## PIPE JOINTS

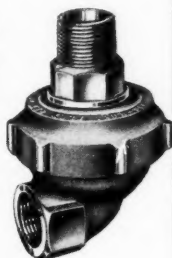
THE  
MODERN  
FLEXIBLE  
SWING  
JOINT

Uninterrupted operation of Vulcanizing Equipment is assured by the use of Roto-Flex Joints.

Modern Vulcanizers can only be as good as the Joints used on the movable steam piping.

Roto-Flex Joints meet today's exacting requirements for quick strain-free movements of all movable piping.

*If you are not already acquainted with Roto-Flex Joints and their many advantages—Write us for fully descriptive literature.*



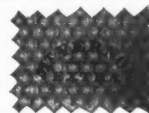
**PITTSBURGH BRASS MFG. CO.**

Penn Ave. and 32nd St., Pittsburgh, Pa.

## Weighing Cotton



• This illustration shows how accurately the moisture content of cotton is measured for accurate and uniform results in manufacturing MT. VERNON EXTRA cotton duck. It is one of many safeguards necessary to maintain the high quality of Mt. Vernon-Woodberry products.



**MT. VERNON-WOODBERRY MILLS, INC.**

**TURNER HALSEY COMPANY**

40 WORTH STREET

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We have it tailor-made to meet each one of your requirements.

Prove **ASTROLITH** and **SUNOLITH** Lithopones in Your Own Plant!

WRITE FOR COMPLETE INFORMATION

**THE CHEMICAL & PIGMENT COMPANY**

St. Helena, Baltimore, Md.

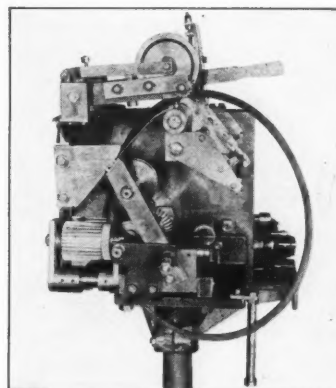
P. O. Box 191, Collinsville, Ill.



Manufacturers of Astrolith and Sunolith, Lithopone, Cadmium Red, Cadmolith, Titanolith (Patent No. 1600772-3), Zopaque (TiO<sub>2</sub>)

Marshall Dill, 510 Montgomery Street, San Francisco, California

## Utility Crimper Type Flipper for Truck and Large Balloon Tires



**UTILITY MANUFACTURING COMPANY**

**Cudahy, Wisconsin**

Registered Cable

Address:

**UTILITY-MILWAUKEE**

Bentley's Code



## United States Statistics

## Imports for Consumption of Crude and Manufactured Rubber

	March, 1937		Three Months Ended March, 1937	
	Pounds	Value	Pounds	Value
<b>UNMANUFACTURED—Free</b>				
Crude rubber	86,648,722	\$16,030,267	276,475,958	\$47,909,376
Liquid latex	4,962,915	968,053	12,376,416	2,278,801
Jelutong or pontianak	2,011,121	187,413	3,106,687	305,210
Balata	65,687	13,949	119,979	24,135
Gutta percha	360,584	59,301	656,669	116,983
Guayule	304,000	37,453	1,123,600	138,426
Siak	11,200	963	33,600	2,863
Scrap and reclaimed	777,100	38,400	2,498,681	82,417
<b>Totals</b>	<b>95,141,329</b>	<b>\$17,335,799</b>	<b>296,391,590</b>	<b>\$50,858,211</b>
Chicle, crude	1,524,754	\$391,295	3,842,181	\$1,089,641
<b>MANUFACTURED—Dutiable</b>				
Rubber tires	11,984	\$20,400	20,009	\$41,450
Rubber boots, shoes, and overshoes	2,334	774	13,934	6,923
Rubber soled footwear with fabric uppers	103,031	31,785	244,567	62,794
Golf balls	59,508	8,230	65,520	9,760
Lawn tennis balls	87,060	6,915	160,340	12,737
Other rubber balls	965,742	23,637	2,318,852	74,252
Other rubber toys, except balls	81,074	10,899	257,654	37,745
Hard rubber combs	73,982	4,603	214,238	12,959
Other manufactures of hard rubber		3,336		11,253
Friction or insulating tape	21,000	1,006	30,300	1,551
Belts, hose, packing, and insulating material		22,211		49,031
Druggists' sundries of soft rubber		6,362		17,177
Inflatable swimming belts, floats, etc.	194,347	14,832	515,988	33,373
Other rubber and gutta percha manufactures	125,517	25,020	396,782	79,509
<b>Totals</b>		<b>\$180,010</b>		<b>\$450,514</b>

## Exports of Foreign Merchandise

<b>RUBBER AND MANUFACTURES</b>				
Crude rubber	2,567,518	\$522,931	5,629,610	\$1,131,837
Balata	40,632	11,749	198,843	56,380
Gutta percha, rubber substitutes, and scrap	232,257	51,503	310,954	69,828
Rubber manufactures		843		3,633
<b>Totals</b>		<b>\$587,026</b>		<b>\$1,261,678</b>

## Exports of Domestic Merchandise

<b>RUBBER AND MANUFACTURES</b>				
Reclaimed	2,017,716	\$88,463	6,054,608	\$266,792
Scrap	6,199,644	79,805	12,333,389	209,445
Cements	43,061	40,675	86,370	78,285
Rubberized automobile cloth, sq. yd.	65,841	29,539	152,809	68,156
Other rubberized piece goods and hospital sheeting, sq. yd.	192,347	83,533	454,502	188,993
Footwear				
Boots	8,432	18,817	29,112	64,571
Shoes	32,125	16,686	83,435	42,533
Canvas shoes with rubber soles	39,893	19,812	89,224	45,246
Soles	5,987	9,489	12,388	21,129
Heels	67,097	36,139	171,335	90,871
Soling and top lift sheets	38,824	8,624	135,397	23,644
Gloves and mittens	8,524	19,859	21,640	46,329
Water bottles and fountain syringes	20,553	7,508	53,359	18,587
Other druggists' sundries		58,126		141,992
Gum rubber clothing	32,545	63,301	83,698	149,559
Balloons	30,715	24,186	94,618	74,051
Toys and balls		8,439		19,964
Bathing caps		9,060		30,338
Bands	33,153	12,503	70,838	27,637
Erasers	32,362	19,202	93,798	56,762
Hard rubber goods				
Electrical battery boxes	32,879	11,405	95,461	37,315
Other electrical	45,287	8,720	127,402	30,397
Combs, finished	8,721	7,371	21,079	15,397
Other hard rubber goods		26,685		65,436
<b>Tires</b>				
Truck and bus casings, number	13,749	260,598	43,150	839,901
Other automobile casings, number	69,377	749,683	207,164	2,136,168
Tubes, auto	49,981	74,914	158,793	241,924
Other casings and tubes, number	4,676	40,472	16,743	116,111
Solid tires for automobiles and motor trucks, number	375	10,414	999	28,074
Other solid tires	98,243	8,052	357,360	46,799
Tire sundries and repair materials		70,127		195,476
Rubber and friction tape		16,129		51,128
Fan belts for automobiles	54,558	27,309	157,214	89,967
Other rubber and balata belts	366,792	167,279	744,692	362,179
Garden hose	131,865	27,929	276,335	60,133
Other hose and tubing	459,402	178,419	1,311,656	482,048
Packing	152,069	81,338	445,479	202,281
Mats, matting, flooring, and tiling	113,100	19,567	294,730	47,789
Thread	66,569	38,751	114,678	114,678
Gutta percha manufactures	59,372	15,145	340,043	92,382
Other rubber manufactures		126,158		368,054
<b>Totals</b>		<b>\$2,627,143</b>		<b>\$7,288,476</b>

## Rubber Goods Production Statistics

	1937		1936	
	Mar.	Mar.	Mar.	Mar.
<b>TIRES AND TUBES*</b>				
Pneumatic casings				
Production	thousands	3,638	thousands	3,638
Shipments, total	thousands	3,856	thousands	3,856
Domestic	thousands	3,784	thousands	3,784
Stocks, end of month	thousands	9,087	thousands	9,087
<b>Inner tubes</b>				
Production	thousands	3,787	thousands	3,787
Shipments, total	thousands	3,796	thousands	3,796
Domestic	thousands	3,737	thousands	3,737
Stocks, end of month	thousands	8,692	thousands	8,692
<b>Raw material consumed</b>				
Fabrics	thous. of lbs.	16,564	thous. of lbs.	16,564
<b>MISCELLANEOUS PRODUCTS</b>				
Single and double texture proofed fabrics				
Production	thous. of yds.	5,255	thous. of yds.	3,268
Rubber and canvas footwear				
Production, total	thous. of prs.	7,595	thous. of prs.	5,905
Tennis	thous. of prs.	4,269	thous. of prs.	2,937
Waterproof	thous. of prs.	3,327	thous. of prs.	2,969
Shipments, total	thous. of prs.	5,439	thous. of prs.	5,041
Tennis	thous. of prs.	4,361	thous. of prs.	3,019
Waterproof	thous. of prs.	1,078	thous. of prs.	2,022
Shipments, domestic, total	thous. of prs.	5,377	thous. of prs.	5,011
Tennis	thous. of prs.	4,309	thous. of prs.	2,997
Waterproof	thous. of prs.	1,068	thous. of prs.	2,014
Stocks, total, end of month	thous. of prs.	16,998	thous. of prs.	15,804
Tennis	thous. of prs.	4,945	thous. of prs.	7,207
Waterproof	thous. of prs.	12,053	thous. of prs.	8,597

\*Data for January to July, 1935, are estimated to represent approximately 97% of the industry; for August, September, October, November, and December, 1935, the coverage is estimated to be 81%.

Source: Survey of Current Business, Bureau of Foreign & Domestic Commerce, Washington, D. C.

## Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
\$3,292	Erasers	Prague, Czechoslovakia
*3,310	Storage batteries for aviation use	Prague, Czechoslovakia
\$3,375	Toys	London, England
*3,376	Automobile accessories	Amsterdam, Netherlands
†3,383	Dolls	Brentford, England
*3,404	Rubber	Baghdad, Iraq
*3,416	Rubberized materials	Paris, France

\*Agency. †Purchase. ‡Purchase and agency.

## Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	8% Cum. Pfd.	\$2.00	June 30	June 11
Baldwin Rubber Co.	Com.	\$0.12½	July 20	July 15
Collyer Insulated Wire Co.	Com.	\$0.35	July 1	June 24
Dominion Rubber Co., Ltd.	7% Pfd.	\$1.75 q.	June 30	June 10
Firestone Tire & Rubber Co.	Com.	\$0.50	July 20	July 2
Fisk Rubber Corp.	Pfd.	\$1.50 q.	July 20	July 10
Flintkote Co.	Com.	\$0.25	June 25	June 15
Garlock Packing Co.	Com.	\$0.75 incr.	June 30	June 19
General Tire & Rubber Co. of Canada	Pfd.	\$1.50 q.	June 30	June 18
Goodyear Tire & Rubber Co.	Pfd.	\$0.62½ q.	July 2	June 15
Jenkins Bros.	Pfd.	\$1.75 q.	July 8	June 24
Lee Rubber & Tire Co.	Com.	\$0.75 ir.	Aug. 2	July 15
Lima Cord Sole & Heel Co.	Com.	\$0.25	July 15	July 1
O'Sullivan Rubber Co., Inc.	Com.	\$0.05	July 30	June 23

## Imports by Customs Districts

	April, 1937		April, 1936	
	Pounds	Value	Pounds	Value
Massachusetts	11,258,495	\$2,068,890	3,956,783	\$562,093
New York	59,053,256	11,661,800	78,529,972	11,189,149
Philadelphia	2,685,182	507,884	3,157,453	497,855
Maryland	1,834,353	340,577	1,326,841	172,559
Mobile			193,760	28,740
New Orleans	2,632,242	490,651	627,200	86,636
Los Angeles	18,515,247	3,460,851	14,174,391	1,849,068
San Francisco	494,209	85,080	625,044	86,884
Oregon	38,080	6,741	33,600	4,949
Michigan	3,149	770		
Chicago	740	104		
Ohio	64,070	12,993	151,865	17,349
Colorado			112,000	13,948
<b>Totals</b>	<b>96,579,023</b>	<b>\$18,636,341</b>	<b>102,888,909</b>	<b>\$14,509,230</b>

\*Crude rubber including latex dry rubber content.

